Numéro 34 | Octobre 2022 | www.smcmaroc.org

SUPPLÉMENT

The Moroccan Journal of Cardiology

Revue Marocaine de Cardiologie

27th National Congress of Moroccan Society of Cardiology

Cross-cultural adaptation and validation of Moroccan version of Minnesota index

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Excipient à effet notoire : lactose et sodium. **FORME PHARMACEUTIQUE ET PRESENTATIONS:** Boîtes de 10 et 30 comprimés pelliculés. **CLASSE PHARMACO-THERAPEUTIQUE:** Inhibiteur de l'HMG Co-A réductase (code ATC : C10AA07). **INDICATIONS THERAPEUTIQUES:** ∩⊂LIP est indiqué dans : ***Traitement des hypercholestérolémies*** : -Adultes, adolescents et enfants âgés de 6 ans ou plus avec hypercholestérolémies pures (type IIa incluant les hypercholestérolémies familiales hétérozygotes) ou dyslipidémies mixtes (type IIb), en complément d'un régime lorsque la réponse au régime et aux autres traitements non pharmacologiques (exercice, perte de poids) n'est pas suffisante. -Hypercholestérolémie familiale homozygote, en complément d'un régime et d'autres traitements hypolipidémiants (notamment l'aphérèse des LDL) ou lorsque ces traitements ne sont pas appropriés. ***Prévention des événements cardiovasculaires*** : -Prévention des événements cardiovasculaires majeurs chez les patients estimés à haut risque de faire un premier événement cardiovasculaire, en complément de la correction des autres facteurs de risque. **POSOLOGIES USUELLES:** Un régime hypocholestérolémiant adapté est obligatoire avant, et pendant toute la durée du traitement. *Traitement des hypercholestérolémies* : La dose initiale recommandée est de 5 ou 10 mg une fois/jour aussi bien chez les patients naïfs que chez les patients précédemment traités par un autre inhibiteur de l'HMG Co-A réductase. Pour un patient donné, le choix de la dose initiale devra tenir compte du taux de LDL-C, du risque cardiovasculaire potentiel ainsi que du risque de survenue d'effets indésirables. Une augmentation de la posologie à la dose supérieure peut se faire après 4 semaines si besoin. A savoir qu'une dose maximale de 40 mg ne sera envisagée que chez les patients présentant une hypercholestérolémie sévère avec un risque cardiovasculaire élevé n'ayant pas atteint l'objectif thérapeutique fixé à une dose de 20 mg/jour et qui feront l'objet d'un suivi régulier. L'avis d'un spécialiste est recommandé lors de l'initiation d'une dose à 40 mg. *Prévention des événements cardiovasculaires* : La dose utilisée est de 20 mg une fois/jour. *Population pédiatrique* : L'utilisation en pédiatrie doit être exclusivement réservée aux spécialistes. •Enfants et adolescents de 6 à 17 ans (stade II-V sur l'échelle de Tanner) : Chez les enfants et les adolescents ayant une hypercholestérolémie familiale hétérozygote, la dose d'initiation usuelle est de 5 mg /jour. •Chez les enfants âgés de 6 à 9 ans présentant une hypercholestérolémie familiale hétérozygote, la dose usuelle varie entre 5 et 10 mg une fois par jour. La sécurité d'emploi et l'efficacité des doses supérieures à 10 mg n'ont pas été étudiées dans cette population. •Chez les enfants âgés de 10 à 17 ans et ayant une hypercholestérolémie familiale hétérozygote, la dose usuelle varie entre 5 et 20 mg une fois par jour. La sécurité d'emploi et l'efficacité des doses supérieures à 20 mg n'ont pas été étudiées dans cette population.•Les ajustements posologiques doivent être réalisés en fonction de la réponse individuelle et de la tolérance au traitement de la population pédiatrique,en tenant compte des recommandations sur les traitements pédiatriques. Les enfants et adolescents doivent suivre un régime hypocholestérolémiant standard avant l'initiation du traitement par la Rosuvastatine, le régime devant être poursuivi pendant la période de traitement. L'expérience chez les enfants présentant une hypercholestérolémie familiale homozygote est limitée à un petit nombre d'enfants âgés de 8 ans à 17 ans. La dose de 40 mg ne doit pas être utilisée dans la population pédiatrique. •Enfants âgés de moins de 6 ans : ∩⊂LIP n'est pas recommandé. *Sujet âgé* : La dose initiale de 5 mg est recommandée chez les patients dont l'âge est supérieur à 70 ans. Aucun ajustement thérapeutique lié à l'âge n'est nécessaire. *Insuffisant rénal* : En cas d'insuffisance rénale légère à modérée, aucun ajustement posologique n'est nécessaire. Une dose initiale de 5 mg est recommandée chez les patients avec une insuffisance rénale modérée (clairance de la créatinine < 60 ml/min). Tandis que la dose de 40 mg est contre-indiquée chez ces derniers. En cas d'insuffisance rénale sévère, tous les dosages de ∩⊂LIP sont contre-indiqués. *Insuffisant hépatique* : ∩⊂LIP est contre-indiqué chez les patients présentant une affection hépatique évolutive. *Particularités ethniques* : Une dose initiale de 5 mg est recommandée chez les patients originaires d'Asie. Par contre, la dose de 40 mg est contre-indiquée chez ces patients. *Polymorphismes génétiques* : Chez les patients connus pour présenter certains types de polymorphismes génétiques, une dose quotidienne plus faible de ∩⊂LIP est recommandée. *Patients présentant des facteurs prédisposants de myopathie* : Une dose initiale de 5 mg est recommandée, alors que celle de 40 mg est contre-indiquée chez ces patients. **VOIE ET MODE D'ADMINISTRATION:** Voie orale.∩⊂LIP peut être administré à tout moment de la journée, indépendamment des repas. **CONTRE-INDICATIONS:** *Ce médicament NE DOIT PAS ETRE UTILISE dans les cas suivants* : - Hypersensibilité à la substance active ou à l'un des excipients. - Affection hépatique évolutive, y compris élévations inexpliquées et prolongées des transaminases sériques et toute augmentation des transaminases sériques au-delà de 3 fois la limite supérieure de la normale. - Insuffisance rénale sévère (clairance de la créatinine < 30 ml/min). - Myopathie. - Ciclosporine. - Grossesse, allaitement et chez les femmes en âge de procréer n'utilisant pas de moyens contraceptifs appropriés. La dose de 40 mg est contre-indiquée chez les patients qui présentent des facteurs prédisposant de myopathie / rhabdomyolyse. Ces facteurs incluent : l'insuffisance rénale modérée (clairance de la créatinine < 60 ml/min) ; hypothyroïdie ; antécédents personnels ou familiaux de maladies musculaires génétiques ; antécédents personnels d'atteinte musculaire avec un autre inhibiteur de l'HMG Co-A réductase ou un fibrate ; consommation excessive d'alcool ; situation favorisant une élévation des taux plasmatiques de la Rosuvastatine ; patients asiatiques ; association aux fibrates. **EFFETS INDESIRABLES:** Les effets indésirables fréquents et peu fréquents ont été rapportés ci-dessous : ***Affections endocriniennes***: Diabète de type II. ***Affections du système nerveux*** : Céphalées, sensations vertigineuses. ***Affections gastro-intestinales*** : Constipation, nausée, douleur abdominale. ***Affections de la peau et du tissu sous-cutané*** : Prurit, rash, urticaire. ***Affections musculosquelettiques et systémiques*** : Myalgie. ***Troubles généraux et anomalies au site d'administration:*** Asthénie. ***Effets rénaux*** : Protéinurie d'origine tubulaire. Des élévations de la créatinine kinase > 10 fois la limite supérieure de la normale ainsi que des symptômes musculaires après une activité physique augmentée chez les enfants et les adolescents comparativement aux adultes. **CONSERVATION:** Conserver ce médicament à une température ne dépassant pas 30°C, dans l'emballage d'origine et à l'abri de l'humidité. **Tableau A (Liste I). Fabriqué par les laboratoires AFRIC-PHAR.**

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APROS.2103.02

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Dépôt légal
N° 2005/0071

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Mot du Président

Mesdames, messieurs.

Chers collègues, chers amis, chers partenaires,

La Société Marocaine de Cardiologie organise son 27e Congrès National du 13 au 15 octobre 2022, couplé au 23e cours panafricain de cardiologie interventionnelle ; ce dernier étant dirigé par le Professeur H. GAMRA de Tunisie.

La Société Marocaine de Cardiologie est honorée de vous accueillir cette année à Tanger, une ville marocaine nichée dans le calme des forêts, entre l'océan Atlantique et la Mer Méditerranée. Cette ville a été un carrefour de civilisations lui valant le nom de « la perle du nord ».

La Société Marocaine de Cardiologie travaille d'arrache-pied depuis de plusieurs mois pour développer un programme scientifique attractif digne des congressistes nationaux et étrangers. Cette 27e édition se caractérise par la participation de nombreux orateurs renommés d'Amérique du Nord, d'Amérique du Sud, d'Europe, d'Afrique et d'Asie, autant dire tout simplement de partout dans le monde.

L'objectif de notre société est de « mondialiser progressivement notre congrès ». Il est évident que l'ouverture de la Société Marocaine de Cardiologie vers tous les continents, nécessite le changement de la langue du congrès, du français à l'anglais. Le programme scientifique mettra l'accent sur les nouvelles recommandations européennes qui seront disponibles à partir de fin août 2022.

Il se démarque aussi par ce qui suit :

- La cardiologie interventionnelle sera largement présente à travers le programme parallèle et parfois simultané avec le PAFCIC via des transmissions en direct ;
- Une session pour les jeunes cardiologues anglophone avec un prix pour le meilleur travail de recherche ;
- La 2e partie des cours de rythmologie dédiée à la fibrillation auriculaire ; - Un « master class » en cardio-oncologie
- La présence de simulateurs pour vulgariser certaines techniques rythmologiques et des ateliers spécialisés dans de nombreux domaines de cardiologie.

Enfin, la ville de Tanger, lieu multiculturel historique, vous accueillera avec la joie et la tradition de la région du nord de notre cher pays. En effet, le Royaume du Maroc, terre de paix, d'hospitalité et d'amitié, offre les conditions idéales pour échanger sur la science.

Au plaisir de vous y retrouver dans votre congrès,

Pour le bureau de la Société Marocaine de Cardiologie

Abdelhamid Moustaghfir,
Président de la Société Marocaine de Cardiologie

Editorial

Pr Aicha Aouad
Past présidente de la Société Marocaine de Cardiologie

Le 27ème congrès national de cardiologie a lieu cette année du 13 au 15 octobre 2022 à Tanger.
Les comités d'organisation et scientifique du congrès vous proposent un programme particulièrement dense et riche illustrant les principales avancées diagnostiques et thérapeutiques dans notre spécialité, et mettent l'accent sur les nouvelles recommandations cardiologiques publiées dans le courant de l'année 2022 (mort subite, cardio oncologie).

Cette 27ème édition est enrichie par un jumelage avec le 23ème cours panafricain de cardiologie interventionnelle (PAFCIC), et se singularise par ailleurs par la présentation des premiers résultats du registre national sur l'insuffisance cardiaque, mis en place à l'initiative de la société marocaine de cardiologie en octobre 2021. L'inclusion des patients a connu la participation de plusieurs structures sanitaires nationales aussi bien privées que publiques, universitaires ou non, témoin du dynamisme de la communauté cardiologique marocaine. Les différentes données collectées, permettront ainsi de caractériser au mieux la typologie des patients inclus ainsi que leur mode de prise en charge dans la vie « réelle ». Ce registre, tout comme celui présenté en 2018 sur l'infarctus du myocarde, n'est qu'un point de départ très encourageant et d'autres thématiques sont prévues dans un futur proche. Continuons alors dans la même dynamique.

La participation active de nos jeunes cardiologues est à féliciter car, une fois de plus, une session entièrement dédiée et organisée par nos cardiologues en herbe est au programme. Après la présentation orale en session plénière, nous vous encourageons à lire de manière attentive les supports écrits de la session rédigés par les auteurs avec la plus grande minutie et publiés dans ce numéro spécial. Il s'agit de travaux de recherche clinique abordant différentes facettes de notre discipline : rythmologie, cathétérisme interventionnel ou encore hypertension artérielle.
N'hésitez pas à découvrir les abstracts des différents posters retenus. Bonne lecture à tous et à toutes.

Pr Aicha Aouad

Cross-cultural adaptation and validation of Moroccan version of Minnesota index
Adaptation transculturelle et validation de la version marocaine de l'indice de Minnesota

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Résumé

INTRODUCTION : L'insuffisance cardiaque est un problème majeur de santé publique ayant un grand impact sur la qualité de vie des patients. L'indice du Minnesota est le questionnaire le plus largement utilisé pour évaluer la qualité de vie de ces patients. Cet indice a été adapté et utilisé par divers pays du monde. Cependant, pour être utilisé au Maroc, il nécessite des études de validité et de fiabilité. L'objectif de ce travail est de développer une version marocaine adaptée transculturellement et validée de cet indice.
METHODES : Une étude observationnelle transversale a été menée auprès d'un total de 125 patients marocains, présentant une insuffisance cardiaque chronique et une fraction d'éjection altérée. L'adaptation transrculturelle et le développement d'une version en dialecte marocain de l'indice du Minnesota sont passés par 5 étapes distinctes suivant les recommandations disponibles, allant de la traduction directe du questionnaire de l'anglais à l'arabe marocain. Le pré-test auprès de 11 patients insuffisants cardiaques a permis de tester la faisabilité et la cohérence du questionnaire. Pour évaluer les propriétés psychométriques, La version marocaine finale a été testée chez 114 patients souffrant d'insuffisance cardiaque chronique.
RÉSULTATS : La validation de la version marocaine de l'indice Minnesota est basée sur une étude des qualités psychométriques qui a montré une acceptabilité de 100% avec un temps moyen de remplissage du questionnaire de 4,94 min ± 1,21, une fiabilité avec une cohérence interne α= 0,94 et une validité avec p < 0,0001. Ensuite, la validité de construit a
été étayée par une analyse factorielle exploratoire, qui a montré deux facteurs, expliquant 71 % de la variance. Le coefficient alpha de Cronbach était de 0,97 et 0,93 respectivement pour le facteur 1 et le facteur 2.
CONCLUSION : Aux termes de ce travail, le model d'adaptation transculturelle de l'indice de Minnesota est valide et peut être utilisé chez la population marocaine pour évaluer la qualité de vie des patients en insuffisance cardiaque.

Mots clés :

Insuffisance cardiaque, étude psychométrique, indice du Minnesota ; adaptation transterculturelle; Arabe marocain

Summary

BACKGROUND: Minnesota index is the most widely used questionnaire to evaluate the quality of life of patients with heart failure. This index has been adapted and used by various countries worldwide. However, to be used in Morocco, it needs validity and reliability studies. This study aimed to translate, cross-culturally adapt and assess psychometric properties of a Moroccan Arabic version of Minnesota index.
METHODS: A cross-sectional observational study was conducted with a total of 125 Moroccan patients, with chronic heart failure and an altered ejection fraction. The cross-cultural adaptation and development of a Moroccan dialect version of the Minnesota Index went through 5 distinctive steps following available guidelines, ranging from direct translation of the questionnaire from English to Moroccan Arabic. The pre-test among 11 patients in heart failure was used to test the feasibility and the coherence of the questionnaire. To assess psychometric properties, The final Moroccan version was tested in 114 patients with chronic heart failure.
RESULTS: The validation of the Moroccan version of the Minnesota index is based on a study of psychometric qualities which showed an acceptability of 100% with an average time of filling in the questionnaire of 4.94 min ± 1.21, a reliability with an internal consistency α= 0.94 and a validity with p < 0.0001. Then, Construct validity was supported by exploratory factor analysis, which showed two factors, explaining 71% of the variance. The Cronbach alpha coefficient was 0.97 and 0.93 respectively for factor 1 and factor 2.
CONCLUSION: According to this work, the cross-cultural adaptation model of the Minnesota index is valid and can be used in the Moroccan population to assess the quality of life of heart failure patients.

Keywords :

Heart failure, Psychometric study, Minnesota index; cross-cultural adaptation; Moroccan Arabic

Introduction

Chronic heart failure (HF) is a common and serious disease. It is a global pandemic affecting at least 26 million people worldwide and is increasing in prevalence [1]. Despite the significant advances in treatment and prevention, Quality of life in HF is still poor and is worse than in many other chronic diseases [2]. Indeed, It profoundly impacts patients' health-related quality of life (HRQoL), via the symptoms it generates and its psychological impact through the limitation of activity, the increase in dependence on other people and the feeling of being at the end of life.

The assessment of quality of life remains less exploited and is often limited to the evaluation of the symptoms. This is due on one hand to the need to involve several disciplines in this evaluation such as psychiatrists and psychologists and on the other hand because a good assessment of the quality of life must make use of reliable and valid questionnaires, often written in a foreign language without any adapted vocabulary to the socio-cultural level of the affected patient. The use of these questionnaires remains very limited and very time-consuming for the doctor who is forced to translate, to explain and adapt the vocabulary to the patient's context. Hence the idea of our work which traces as a goal the transcultural adaptation and the validation of the Moroccan version of the Minnesota living with heart failure questionnaire (MLHFQ).

The choice of this questionnaire was based on the fact that it is one of the most known disease-specific instruments for measuring HRQoL [3]. This scale has been adapted and translated to at least 35 languages in various countries and has shown good psychometric properties. A classical Arabic version has been culturally adapted in Lebanon, but given the cultural diversity of the Arab populations, and the high proportion of illiterate people in Morocco, a classical Arabic version cannot be used in all sittings [4] [5]. Yet, up to date, there are no psychometric studies on the MLHFQ in the Moroccan population. This study aimed to translate and evaluate the applicability, internal consistency, and validity of the MLHFQ and to investigate the internal structure in the Moroccan population.

METHODS

Study design and population

The study was conducted using a descriptive cross-sectional design. It was carried out in 2 different stages according to the following guide: First, cross-cultural adaptation of the Moroccan dialect version of the Minnesota index. Second, Validation of this Moroccan version of the Minnesota index by evaluating the psychometric qualities of the questionnaire in a Moroccan population [6]. A random sample of 125 outpatients was collected from cardiology consultations in Ouarzazate between April 2018 and April 2019 and in the Cardiology department of Mohammed VI University Hospital of Marrakech between March 2021 and August 2021.

Moroccan Arabic-speaking patients aged from 18 to 80 years, with chronic heart failure with reduced ejection fraction, according to the European society of Cardiology criteria, defined the target population [7]. Patients were eligible for the study if they had a recent echocardiography (during the last 6 months) and agreed to participate. Patients with conditions that may impact lower limb function (osteoarticular, neuromuscular or vascular diseases) or global physical ability (respiratory failure), as well as those who had a - Cardiac decompensation less than a month ago, or who may have difficulty to understand or respond to the questionnaire (such as those who have psychiatric or cognitive problems) were excluded. Eleven patients participated in pre-testing the adapted version and 114 patients participated in the validation study. Only adherent patients after free and informed consent were recruited. Data collection was carried out with respect for the anonymity of patients and the confidentiality of their information.

The collection of information was carried out at the end of the interrogation of the patients and from the data of the medical file using a pre-established sheet. Due to the high frequency of illiterates, the questions of the Moroccan version of MLHFQ were stated word for word as they are written. The researcher had the option of repeating the questions but could not change the words.

Measures

The MLHFQ

The MLHFQ was developed in the United States in 1984 by Professor Thomas S. Rector and Professor Jay N. Cohn director of the Cardiovascular Division at the University of Minnesota [8]. This instrument is a self-administered questionnaire made to measure the quality of life (QoL) of patients with chronic heart failure. The questionnaire includes 21 Items to assess the impact of heart failure over the past 4 weeks on 3 domains: Physical, Socio-economic and Emotional. Each item is rated from 0 (no impact on quality of life) to 5 (great impact on quality of life). The final score of the questionnaire therefore ranges from 0 to 105. Higher scores indicate worse HRQoL [8].

The SF-36

Originally published in 1992 in Medical Care, the 36-Item Short Form Survey (SF-36), is the generic instrument most often used in medicine for the general assessment of quality of life. It contains 36 Items that cover 8 pillars of health (physical activities, social activities, moral, physical and emotional resistance to carry out daily tasks, physical pain, general mental health, vitality, perception of the state of health in general). Scores for each domain range from 0 to 100, with a higher score defining a more favorable health state. This questionnaire has been used in thousands of research studies. It is also available and validated in several languages [9].

Translation and cultural validation [10] [11] [6]

The MLHFQ was first translated from English to the Moroccan dialect by two teams of different and independent Moroccan translators.

One of the teams (health professionals: 2 cardiologists, a cardiology nurse and a physiotherapist) was informed of the purpose of the process and the concepts involved in the Instrument. The other team of translators (2 English teachers) was not informed of the purpose of the translation. Next, the Moroccan Arabic version was back-translated to the English language by two other independent translators and compared to the original English version. The original and back-translated versions were semantically equivalent. Both versions were then checked to correct any inconsistencies. The final version, based on the various translations and reverse translations, was corrected by an expert committee made up of a psychiatrist, a cardiologist, a psychologist and a nurse. The final version was tested on 11 patients with heart failure to test the feasibility and consistency of the questionnaire in practice.

For the purpose of validation study, data on Age, gender, profession, educational level and geographical origin, as well as the duration of the disease in years (duration of dyspnea) were collected among 114 patients. The New York Heart association (NYHA) was used to evaluate the intensity of dyspnea for daily activities. Patients were asked to respond to the adapted Arabic version of the SF36. All the previous parameters and other clinical measures like left ventricle ejection fraction (LVEF), systolic pulmonary artery pressure (sPAP) and the 6 min walk test were collected on a pre-established form. Then, the participants were asked to respond to the final Moroccan MLHFQ.

The metrological qualities of the index have been analyzed, according to the procedures for validating measurement scales proposed by the American Psychiatric Association. Firstly, Acceptability was tested by analyzing the percentage of refusals, missing data, completed questionnaires, items that are difficult to understand or confusing and the time required to answer the test. It was assessed from the results of the first test (the 1st administration of the adapted version of the Minnesota Questionnaire). Secondly, after an average delay of one day, the adapted version of the Minnesota questionnaire was administered by the principal investigator during a telephone call to a subsample of 20 patients (chosen randomly) whose states are deemed stable. The reproducibility of each item was assessed using the intraclass correlation coefficient (ICC) or the kappa coefficient of a variable, respectively depending on whether it is a quantitative or qualitative variable.

Internal consistency is the property that items measuring the same attribute produce strongly correlated scores. It was evaluated by Cronbach's alpha coefficient. A value high of this coefficient (≥0.70) is usually considered satisfactory. Cronbach's alpha was calculated from the results of the first test.

Convergent construct validity was estimated by correlating the global score of the index with the score of close concept variables measuring functional disability and the stage of heart failure: NYHA stage, 6 min walk test, LVEF, SF36… Divergent construct validity was assessed by correlating the global index scores with the score of variables known to have no or minimal correlation with functional disability or dyspnea. These variables are disease duration and sPAP. For Internal Construct Validity, factor analysis was performed by principal component analysis followed by factor extraction. The factors retained were those with an eigenvalue greater than 1. The independent factors were obtained using the Varimax rotation method.

The statistical analysis was performed on SPSS version 18 software. Quantitative variables were described using means, standard deviation and limits. Qualitative variables were described using percentages.

RESULTS

Translation and cross-cultural adaptation

The model obtained as a result of this cross-cultural adaptation is presented in Appendix I .

Sample characteristics

The majority of recruited patients were male (86%). The mean age was 57 years +/- 9 with extreme ages ranging from 23 years to 75 years. Patients of urban origin represented 74% of the study population against 26% of rural origin. Over half of the patients had no professional activity. Moreover, 65% of the patients were illiterate and 14% had a secondary level of education. The clinical characteristics of the patients participating in the study are summarized in table I .

Table I: Clinical characteristics of patients

Variables	Max	Min	Mean	Standard deviation
Age	75	23	57	9
Duration of illness	11	2	4	2
LVEF	39	18	27	12
Walking distance 6 min (m)	500	300	420	20
Moroccan version MLHFQ	19	67	41	10

Psychometric properties

The response rate was 100%. The translated questionnaire was well accepted by the patients. No missing data, discrepancies or inconsistencies were noted. All items were well understood by the patients. The mean time to complete the questionnaire was 4.94 min with a range going from 2min to 6.16min.

The questionnaire was completed twice 24 hours apart by 20 patients. At t1, the MLHFQ's mean score was 41± 10 [19–67]. At t2, the mean's score was 42 ± 9 [19-67]. The intraclass correlation coefficient (ICC) reveals excellent repeatability at 0.96 [0.959; 0.985]. Analysis according to the Bland and Altman method (figure1) showed a centered and homogeneous average of differences, as well as the absence of systematic effect (r =–0.1667). Internal consistency was acceptable for the overall score (Cronbach's alpha coefficient α= 0.94).

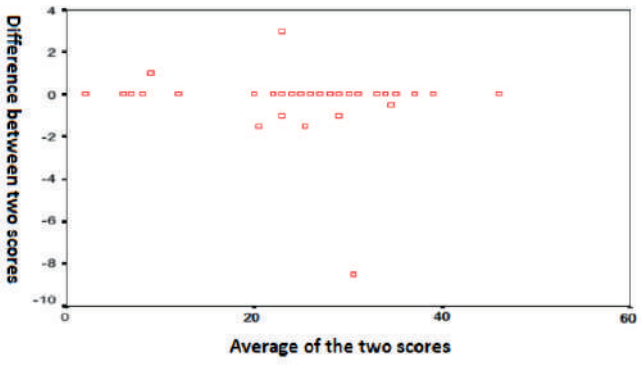

Figure 1:
Test-retest reliability of the Moroccan version
of MLHFQ according to Bland and Altman representation

Construct validity was assessed by evaluating the relationship of the Moroccan version of MLHFQ scores to measures of functional ability, SF36 score and LVFFE. Almost all items showed good item-to-scale correlations (r>0.41). These correlations ranged from 0.41 to 0.74 (Table II). Except for Moderate correlations which were observed between LVEF(r=0.24) and 6MWT (r=0.39) and the Minnesota global index. Spearman correlation coefficients for comparison of the MLHFQ scores with left ventricular ejection fraction and the value of the NYHA classification were r = 0.24 (p = 0.011) and r = 0.53 (p < 0.0001) respectively. As indicated in Table II, the correlation between the functional scales of the MOS SF-36 with the MLHFQ scores were strongly significant (p < 0.0001) and ranged from r = -0.41 (emotional role) to r = - 0.74 (VITAL). Divergent validity was attested by observing expected weak correlations between the MLHFQ and disease duration and systolic lung pressure. The results of the convergence and divergence validities for the adapted version of the MLHFQ are presented in Table II.

Table II: Construct validity of the adapted form of MLHFQ

Convergent validity	Spearman's rank correlation coefficient	P value
NYHA	r= 0.53	P< 0.0001
LVEF	r= -0.24	P< 0.011
6MWT	r= -0.39	P< 0.0001
SF36		
Physical functioning	r= -0.598	P< 0.0001
physical role	r= -0.544	P< 0.0001
emotional role	r= -0.409	P< 0.0001
Social functioning	r= -0.524	P< 0.0001
Mental Health	r= -0.624	P< 0.0001
Perception of pain	r= -0.577	P< 0.0001
Vitality	r= -0.737	P< 0.0001
General perception of health	r= -0.650	P< 0.0001
Divergent validity		
Duration of illness	-0.06	P<0.01
Systolic lung pressure	-0.07	P<0.01

Tables III and IV show the results of the factor analysis. This analysis made it possible to extract two factors, which explained 72.5% of the total variance. Fourteen items of the physical and the social domains loaded to the first factor while seven items of the emotional scale loaded to the second factor. The Cronbach alpha coefficient was 0.97 and 0.93 respectively for factor 1 and factor 2. Correlation between items of questions in factor 1 was stronger compared to its correlation with factor 2 (r: 0.65 – 0.82 vs. r: 0.002– 0.560). Items of questions in factor 2 also had stronger correlation with factor 2 compared to its correlation with factor 1 (r: 0.602 – 0.820 vs. r: 0.104 – 0.579). The correlation of factor 1 and factor 2 with the total score of MLHFQ had been demonstrated to be strong (r > 0.55) (Table III). According to the inter item correlation matrix, almost all of the items were above 0.60, indicating a great multicollinearity.

Table III: Total explained variance

Factors		Rescaled loadings	Eigenvalues		Rotation sums of squared loadings		
			Factor 1	Factor 2	% of variance	Cumulative variance	Cronbach's alpha
Factor I	Question 1	0.763	0.670	0.384			
	Question 2	0.863	0.790	0.396			
	Question 3	0.879	0.791	0.419			
	Question 4	0.906	0.786	0.468			
	Question 5	0.904	0.784	0.469			
	Question 6	0.841	0.742	0.420			
	Question 7	0.873	0.756	0.453	42.66	42.66	0.968
	Question 8	0.902	0.818	0.422			
	Question 9	0.827	0.811	0.311			
	Question 10	0.558	0.699	0.022			
	Question 11	0.727	0.684	0.310			
	Question 12	0.869	0.705	0.511			
	Question 13	0.883	0.694	0.546			
	Question 14	0.815	0.652	0.490			
Factor II	Question 15	0.829	0.579	0.602			
	Question 16	0.768	0.482	0.626			
	Question 17	0.836	0.481	0.736			
	Question 18	0.804	0.396	0.791	29.87	72.53	0.929
	Question 19	0.777	0.374	0.775			
	Question 20	0.596	0.104	0.821			
	Question 21	0.748	0.335	0.778			

Table IV : Matrix of components after Varimax rotation

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21
Q1	1.00																				
Q2	0.71	1.00																			
Q3	0.66	0.83	1.00																		
Q4	0.65	0.84	0.88	1.00																	
Q5	0.65	0.81	0.87	0.92	1.00																
Q6	0.67	0.72	0.72	0.73	0.74	1.00															
Q7	0.67	0.75	0.77	0.81	0.81	0.75	1.00														
Q8	0.64	0.79	0.80	0.85	0.85	0.75	0.82	1.00													
Q9	0.60	0.70	0.73	0.75	0.75	0.70	0.74	0.83	1.00												
Q10	0.48	0.47	0.45	0.46	0.45	0.50	0.47	0.56	0.65	1.00											
Q11	0.60	0.63	0.64	0.64	0.64	0.61	0.65	0.62	0.58	0.43	1.00										
Q12	0.62	0.72	0.75	0.73	0.76	0.76	0.73	0.77	0.69	0.47	0.62	1.00									
Q13	0.59	0.76	0.77	0.79	0.80	0.73	0.76	0.81	0.72	0.43	0.64	0.78	1.00								
Q14	0.57	0.68	0.68	0.70	0.70	0.66	0.65	0.70	0.62	0.43	0.55	0.78	0.71	1.00							
Q15	0.58	0.65	0.69	0.71	0.72	0.68	0.67	0.69	0.61	0.37	0.57	0.72	0.70	0.79	1.00						
Q16	0.62	0.59	0.60	0.62	0.62	0.61	0.62	0.61	0.56	0.32	0.58	0.65	0.63	0.66	0.71	1.00					
Q17	0.58	0.63	0.66	0.72	0.71	0.63	0.71	0.72	0.64	0.36	0.53	0.70	0.71	0.64	0.71	0.70	1.00				
Q18	0.54	0.63	0.63	0.67	0.67	0.59	0.64	0.69	0.57	0.35	0.47	0.66	0.69	0.65	0.66	0.62	0.80	1.00			
Q19	0.50	0.60	0.60	0.65	0.63	0.56	0.60	0.66	0.57	0.36	0.48	0.62	0.69	0.60	0.65	0.59	0.74	0.81	1.00		
Q20	0.43	0.42	0.46	0.48	0.48	0.45	0.46	0.43	0.38	0.18	0.33	0.46	0.50	0.36	0.47	0.48	0.57	0.58	0.58	1.00	
Q21	0.54	0.56	0.56	0.59	0.59	0.60	0.59	0.57	0.55	0.37	0.50	0.63	0.63	0.56	0.60	0.59	0.65	0.69	0.68	0.70	1.00

DISCUSSION

With the increase in the number of multicultural and multinational health research projects, the need to adapt the questionnaires, used for this purpose, to languages other than the source language has also grown rapidly. Indeed, most health questionnaires have been developed in English-speaking countries, and that is also the case for the Minnesota questionnaire [10]. The cultural differences from one country to another necessitate the use of rather onerous translation and adaptation methods in order to maintain the validity of the content. Several methods of cross-cultural adaptation have been proposed in the literature, the most important of which are the recommendations proposed by Guillemin and Beaton et al [10] [6] [12]. They have the advantage of preserving the equivalence between the 2 versions. It is also the protocol most often adopted in our faculty of medicine and pharmacy in Marrakech. The protocol consists of 2 main parts: Stages of transcultural adaptation and Stages of validation. Regardless of the care with which each of the stages of the translation and transcultural adaptation of an instrument has been carried out, and regardless of the methodological framework chosen, it is absolutely necessary to always verify empirically and a

posteriori the psychometric properties of the instrument. Scale "validation" is the entire process of demonstrating that the scale is reliable and valid [4].

In the same way, our report discusses the Moroccan translation and preliminary psychometric testing of the Minnesota LHFQ. This most widely used questionnaire was chosen because it is an established disease-specific instrument which has shown reliability and validity within international, double-blind, multicenter, pharmaceutical clinical trials [3]. It is a self-administered questionnaire and easy to fill in [8]. Although it was previously translated to a Lebanese Arabic version, most questions required a different phrasing to avoid misunderstanding and to ensure idiomatic equivalence. For all these reasons, the translation of the questionnaire and the study of the psychometric parameters of the Moroccan population seemed necessary.

In the step of translation, the structure of the questionnaire was not altered and the 21 items were retained. Then, the construct validity of the Moroccan version of the MLHFQ was examined using factor analysis and item-subscale correlations. A sample size of 114 participants was large enough to perform factor analysis, and two factors were loaded. Item-subscale correlation coefficients showed that all items were correlated highly to their loaded subscale, but they had low correlations to the other subscales. This also verifies the construct validity of the instrument. We will discuss the results of each step more in-depth in light of the existing literature. To our knowledge this is the first study that has conducted a cross-cultural validation of the Moroccan version of the MLHFQ.

Cronbach's alpha was calculated at 0.94 for the Moroccan version of the MLHF questionnaire which was similar to reported results of Greek (0.97), German (0.94), Portuguese (0.95), Lebanese (0.92), Persian (0.97) and Chinese (0.97) versions [5] [13] [14] [15] [16] [17]. It represents the high internal consistency of the questionnaire. On the other hand, the calculated Cronbach's alpha for Indonesian and Brazilian versions was reported at 0.88 and 0.85, respectively [18] [19]. The difference in Cronbach's alpha among different versions can relatively be indicative of the cultural difference in studied communities. The result of the ICC test after 24 hours (0.96 in the range of 0.959 to 0.985), which in comparison with the ICC of the Spanish version of the questionnaire (0.97 in the range of 0.74 to 0.83) and the persian version (0.97 in the range of 0.92 to 0.95), represents high repeatability of the Moroccan version of the MLHF questionnaire [16] [20].

MLHFQ was developed specifically for heart failure, which makes it an instrument much more suited to the reality of these types of patients. For this reason, this questionnaire may differ in some questions when compared to other generic questionnaires, such as the SF-36 which was developed for chronic diseases. In spite of this, in our study, good consistency was found between the MLHFQ and the SF-36. The high score in the MLHF questionnaire indicates a low quality of life while the high score in the SF-36 questionnaire indicates a good quality of life-related to the health status of the patient. There is an inverse correlation between these two, and the Pearson correlation coefficient is negative. The total score of the MLHFQ was moderately or highly correlated to all dimensions of the SF-36 ranging from –0.46 up to –0.70; with the highest correlation observed with the mental health of the SF-36 (r = –0.65) and the lowest with the emotional domain (r = –0.31), in line with results of previous studies.

Correlations with the SF-36 were especially consistent with previous works demonstrating measurement equivalence. The greater the impact of HF on individuals' physical, social, or emotional lives, the lower their scores were on the SF-36. This provides compelling evidence for the construct validity of the MLHFQ in this Moroccan version of the instrument [20] [19] [21].

The Low correlation of the MLHFQ between subjects with LVEF can be explained by the lack of specificity of the LVEF in determining HF symptoms. This has also been observed in other studies. Patients with normal or slightly lowered LVEF may be symptomatic, but it is also possible to observe patients with lowered LVEF who do not present any symptoms. As the effect of HF on patients' quality of life must be mediated in great part through the symptoms, it is possible to understand the lack of correlation among LVEF and quality of life measures [3].

Also, factor analysis categorized questions into two general dimensions, similar to the original version of the questionnaire. The results of the validity are represented by a stronger item correlation of questions in the first domain with those in the first domain compared to the correlation with the second domain (r: 0.571 – 0.748 vs. r: 0.137 – 0.506). Items of questions in the second domain also have a stronger correlation with the second domain compared to the correlation with the first domain (r: 0.676 – 0.718 vs. r: 0.188 – 0.499). The correlation of the first and second domains with the total score of the MLHFQ questionnaire has been demonstrated to be strong (r > 0.6). The present study has similar correlations of item-domain compared to the original study that has correlations of physical item-domain (r: 0.53- 0.84) and emotional item-domain (r: 0.60-0.81).20 Similar results on construct validity with other studies have also been observed, which describes greater item correlation of questions in physical domain with physical domain compared to emotional domain and likewise [17] [15] [22].

Table V: comparative table of socio-demographic characteristics and psychometric qualities of studies in the literature with our study ; n: number of patients participating in the study

	Sociodemographic characteristics	Psychometric qualities
The Moroccan study: n: 114	Average patient age: 57 years +/- 9. Gender: 86% of the sample studied gender male Education: 65% of illiterate patients	Acceptability: 100% Average filling time of the QMPIC: 4.94 mins ± 1.21 Reliability: -a repeatability of 0.96 [0.959; 0.985] -Internal consistency: (α= 0.94) Validity: P< 0.0001
The German study [14] : n: 114	Average age of patients: 57 years +/-9 Gender: 86% of the sample studied gender male	Acceptability: 100% Average filling time of the QMPIC: 4.77 mins Reliability: -Internal consistency: (α= 0.94) Validity: P< 0.000
The Italian study [21]: n: 1192	Average patient age: 72.4 years. Gender: 58% of the population studied masculine. Education: nearly 80% of patients do not no longer than high school.	Reliability: -Internal consistency: (α= 0.91) Validity: P< 0.0001
The Greek study [13]: n: 128	Age: the age of the patients ranged from 41 to 90 years old. Sex: 78.1% of the population studied masculine. Education: 51.6% of patients with a primary school level.	Reliability: -Internal consistency: (α= 0.95) Validity: (P <.01)
The Lebanese study [5]: n: 210	Average patient age: 64.26 +/- 15.18 Sex: 74.8% of the population studied masculine. Education: 43.3% of patients with a school level below high school.	Reliability: -Internal consistency:(α= 0.92) Validity: P< 0.0001

Conclusion

The assessment of the quality of life in patients with chronic heart failure is an integral part of the management of these patients. It must be codified and adapted to the clinical and socio-cultural context of each patient. The model of transcultural adaptation of Moroccan dialect to the Minnesota index proposed by our work constitutes a means adapted to our culture and our context for the evaluation of the quality of life in HF patients and would make it possible to integrate this notion into our consultations as cardiologists.

Appendix I: Minnesota Questionnaire for Patients heart failure: Moroccan version

استمارة التقييم الوظيفي "مينيسوتا" لمرضى ضعف القلب							
واش كتظن أن ضعف القلب ديالك ما خلاكش تعيش هاذ الشهر اللخر كيفما مالف حيت	لا						يزاف
	0	1	2	3	4	5	
1 كينفخ رجليك أو سيقانك							
2 نقص من حركتك داخل الدار							
3 ما خلاكش تشارك عائلتك أو صحابك أش كايديرو							
4 خلاك جالس أو متكي النهار كامل							
5 خلاك عيان أو مهدود							
6 ما خلاكش ترزق الله كيما مالف							
7 خلا المشي أو طلوع الدروج صعيب عليك							
8 كيخليك تنهج							
9 كيخلي نعاسك مبرزط في الليل							
10 ما خلاكش تاكل داكشي لي مشهي							
11 خلا الحركة أو التنقل صعيبة على برا							
12 ما خلاكش تعيش حياتك الزوجية كيفما مالف							
13 بزطك في راحتك أو هواياتك							
14 ما خلاكش تركز مزيان							
15 عرضك لمضاعفات الدوا							
16 خلاك ديما مهموم							
17 ما خلاكش على كانتك (خاطرك ضيق أو مهموم)							
18 زاد عليك مصاريف الدوا أو الطبيب							
19 خلاك فاقد الإحساس بالأمان							
20 خلاك تبقى بزاف في السبيطار							
21 خلاك حاس تراسك ثقيل على عائلتك							
المجموع							

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NAVCOM:

NAVVUS versus COMET for the measurement of the fractional flow reserve
NAVVUS versus COMET pour l'évaluation de la réserve fonctionnelle coronaire

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Abstract

Fractional flow reserve measurements (FFR) are widely used during coronary interventions for the guidance of revascularization. While multiple pressure guidewires have been validated and are constantly used for these measurements, two generations of microcatheters can be used in this indication presenting some benefits and inconvenient.
The measurement of fractional flow reserve is based on the ratio of the coronary lesion upstream and downstream pressure with a threshold of 0.80 below which the lesion is considered functionally significant and should be revascularized following specific guidelines.
The NAVVUS microcatheter is a monorail system that allow to use routine guidewires to cross the coronary lesions.
The aim of this study is to compare the NAVVUS microcatheter to the pressure guidewire COMET of Boston Scientific.
A total of 213 coronary artery lesions have been evaluated with one of these two coronary tools over a period of 4 years and half with 9,2% of crossing failure found with the NAVVUS microcatheter versus 0,7% in the COMET wire (p<0,001). Crossing failure was significantly correlated to the presence of coronary artery calcifications and coronary angulations. FFR values were comparable between the two groups, while the FFR measurements were significantly affected by the presence of coronary calcifications and lesions length.
Our observations are in line with other studies reporting crossing failure of the NAVVUS microcatheter.

Keywords: Fractional flow measurements, Coronary artery physiology, Microcatheter, Pressure guidewire

Introduction

Coronary artery angiography is the cornerstone to confirm significant coronary artery disease (CAD). The anatomic evaluation of the coronary arteries is based on the detection of epicardial coronary artery lesions that may be often overestimated due to the well-known oculo-stenotic reflex. New methods have been proposed to overcome these biases, in particular the quantitative coronary analysis (QCA) which can be measured during the procedure to obtain an objective measure of the length and the diameter of coronary artery stenosis at the diastolic cardiac phase.
The coronary artery angiogram detects only 5% of the total coronary tree and coronary artery circulation depends on multiple mechanisms regulated by coronary artery resistances. In fact, the epicardial coronary vessels are conductance vessels and represent only 10% of the coronary artery resistance, while the microvasculature gives 90% of the coronary resistance [1].
Therefore, the functional evaluation of coronary artery severity is a pillar of coronary artery disease treatment.

Fractional Flow Reserve (FFR) is defined as the ratio of maximal hyperhemic blood flow in the presence of a stenosis divided by the normal hyperhemic blood flow without stenosis and is approximated as the ratio of distal coronary pressure (Pd) divided by aortic pressure (Pa) at maximum hyperhemia (FFR=Pd/Pa) [2].
The FFR indicates the flow drop across a coronary artery lesion at maximal hyperhemia and has been well correlated to reversible defect, after revascularization, found by non-invasive stress test (e.g thalium exercice testing and stress echocardiography using the threshold of 0,75 [3].
Multiple trials have supported coronary arterial hemodynamical evaluation by using the FFR. In fact, the DEFER, the FAME and FAME 2 trial demonstrated the superiority of hemodynamically guided percutaneous interventions (PCI) compared with angiographic guidance.
These three important trials together led the FFR to be indicated class IA in guiding revascularization techniques [4].
Nowadays, FFR is indicated in angiographically intermediate coronary artery lesions, including left main stem, multivessel diseases, sequential stenoses, bifurcations and ostial branch stenoses [5, 6].

Along with the increasing use of FFR, many industries have developed different FFR systems. The optical sensor microcatheter from ASCIT (NAVVUS) is the only catheter that allow 0.014" routine guidewire use.
Besides its applications, the FFR use present some limitations [7]. Thus, non-hyperhemic pressure indices have been proposed to overcome these limitations [8]. These new indices have been well correlated to the FFR and can be used to guide coronary revascularization strategy using an hybrid algorithm [9].
The objective of this study is to compare two different devices used for FFR measurements, the pressure guidewire COMET (BOSTON Scientific) and the microcatheter NAVVUS (ACIST). We first aimed to balance their entry profile to evaluate the reliability and safety of these two products and secondary to oppose their hyperhemic and non-hyperhemic (NHPR) pressure values.

Material and method

1/ Study type

It relies on a retrospective study conducted over two periods, between 2015 and 2018 using the first NAVVUS and the COMET system, and resumed in the first semester of 2022 using the second NAVVUS system. This study has been conducted in Ambroise Pare University Hospital of Mons, Belgium.
All the patients aged more than 18 years old presenting to the coronary angiography catheterization laboratory for a coronary angiography were included. The patients presenting with acute coronary syndrome (ACS) and another intermediate non-target vessel disease were also evaluated.
Exclusion criteria included coronary artery vessels of less than 2,25 mm diameter and target vessel lesions of ACS.

2 / Coronary angiography protocol:

A standardized coronary angiography protocol was used. Right radial access was the most common used. Other approaches as left radial or femoral artery was performed in few cases.
4mg of nicardipine was injected in the radial arterial sheath to avoid arterial spasm. All diagnostic procedures were performed using 5 French diagnostic catheters. 50 to 70 UI/kg of unfractionated heparin (UFH) was intravenously injected for the coronary artery angiography completed to 100 UI/kg of UFH in case of FFR measurement. Activating clotting time was measured during the procedure to avoid any thrombotic events. 4 to 6 angiographic views were taken for the left coronary system and 2 to 3 views for the right coronary system.
Quantitative coronary analysis was measured in all the patients included in the first semester of 2022 to obtain objective length, reference diameter and percentage of the stenosis.
1 mg of isorbide dinitrate was injected intracoronary after the first film for maximal vessel vasodilatation.

3/ technique and measurements:

Angiographic intermediate coronary artery lesions led to quantitative coronary analysis assessment. Tortuosity, angulation, calcification and the presence of bifurcation were noted by the physician.
After administration of intracoronary nitrate and normalization of the pressure wire, FFR and NHPR were evaluated by a standard technique with the wire placed at least 3 vessels diameters distal to the stenosis. Two measurements of DFR or dPR were saved at an interval of 1 minute.
All the patients received intravenous continuous adenosine perfusion at 140 µg/kg/min
via a peripheral vein.
The majority of the procedures have been performed using a 5F guiding catheter, while some were done using a 6F guiding catheter. The workhorse guidewire routinely used in the NAVVUS group of patients, was the balance middle weight (BMW, Abbott,Chicago,USA)
This guidewire was placed distally to the coronary artery with the NAVVUS microcatheter advanced until the sensor was positioned 10 to 15 mm downstream to the coronary stenosis evaluated.
With the COMET, the same steps were followed but a workhorse guidewire was not necessary. The radio opaque part of the guidewire which corresponds to the fiber optic sensor was advanced 5 to 10 mm downstream the stenosis.
Manual pullback was done by the operator to characterize where the most important drop pressure occurred and also to evaluate the pressure drift once back in the guiding. A significant pressure drift was considered in case of 0,04 or more drift in FFR. In this case, a new pressure normalization and new measurements were repeated.

4/ Statistical analysis:

The data of the patients included in the first part of the study were collected by reviewing the clinical file and the coronary angiogram.
All the information was reported on an Excel file. SPSS 28.0 was used for statistical analysis.
Primary observation of this study was the crossing profile of the two FFR systems and secondary ones included the comparison of FFR, DFR and dPR values, pressure drift and procedure complications.

Results

1 / Demographic characteristics:

A total of 186 patients presenting 213 intermediate coronary artery lesions were included in the study.
Sex ratio was 2,2. Mean age was 65,5± 8,8 years old. Major cardiovascular risk factors are reported in table 1, with no statistical difference between groups

Table 1 Chi² test of cardiovascular risk factors

CVRF / FFR	NAVVUS	COMET	p
HTA	69%	74%	0,442
DT	48%	42%	0,419
Dyslipidemia	54%	58%	0,350
Tobacco	46%	47%	0,875
LEAD	11%	18%	0,255

2/ Angiographical and physiological coronary assessment:

Coronary angiography was indicated in 1453 patients. The main indication was typical chest pain assessment (30%) followed by positive non-invasive stress test (26,1%). The other indications were heart failure workup and abnormal coronary angiography computed tomography (CT) in respectively 8 and 7,5% of the cases. Detailed indications are presented in the figure below.

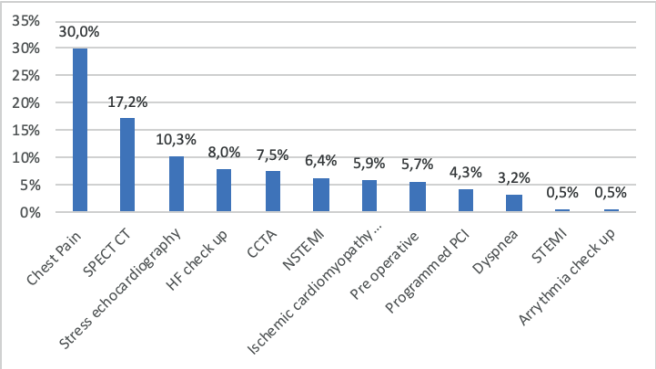


Figure 1 : Detailed Coronary artery angiography indications

Fractional flow reserve was measured in 13% of the patients with an increasing usage during the time of the study. Similar clinical and angiographic characteristics were found in these two groups. The COMET pressure wire was used in 137 cases, while the NAVVUS in 76 cases.

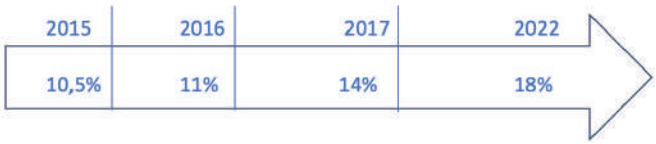


Figure 2 : Coronary physiological assessment evolution over years

The proportion of evaluated coronary arteries are represented in figure 3.

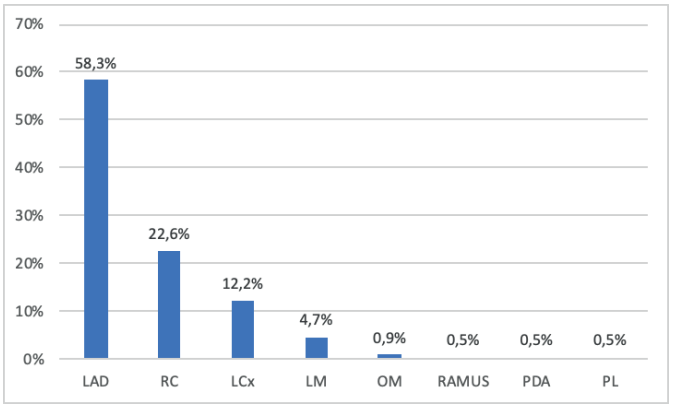


Figure 3 : Coronary artery vessels evaluated by FFR

By QCA the mean reference diameter was 2,97± 0,37 mm with a maximum of 4,5 mm and a minimum of 2,26 mm. Mean coronary artery lesions percentage was 49,87±8,38 %. Mean length was 18,97±5,87 mm with a minimum of 6 mm and a maximum of 40mm.
Angiographical characteristics of coronary arteries are represented in table 2.

Table 2 : Coronary artery angiographical characteristics

Caracteristics / System	NAVVUS(n=73)	COMET(n=136)	p value
Tortuosity	35%	32%	0,627
Angulation	28%	21%	0,284
Calcification	47%	57%	0,184
Bifurcation	33%	30%	0,649

3/ Main results:
a/ Crossing profile:
We had 7 cases of failure of crossing in the NAVVUS group versus 1 in the COMET group.
Out of the seven cases, 4 cases were reported during the first semester of 2022 despite the catheter improvement. Thus, 9,2% of the coronary artery lesions could not be crossed with a p value of <0,001 (χ2).
Crossing failure was mainly associated with coronary artery calcifications with a p value of 0,042 and coronary artery tortuosity with a p value of 0,049.

b/ Hyperhemic and non-hyperhemic pressure indices:
Evaluation of coronary arteries included the measurement of coronary pressure gradients at rest and after induced hyperhemia in both groups.
A non-significant difference of 0,014 was found between the FFR in the two groups (p=0,718)

Table 3 Mean FFR value by group

	FFR SYSTEM	N	Mean FFR
FFR	NAVVUS	66	,8023
	COMET	127	,8165

The bivariate correlation of Pearson revealed a relatively good correlation of rest and hyperhemia indices with an R2 = 0,474 (p<0,01)

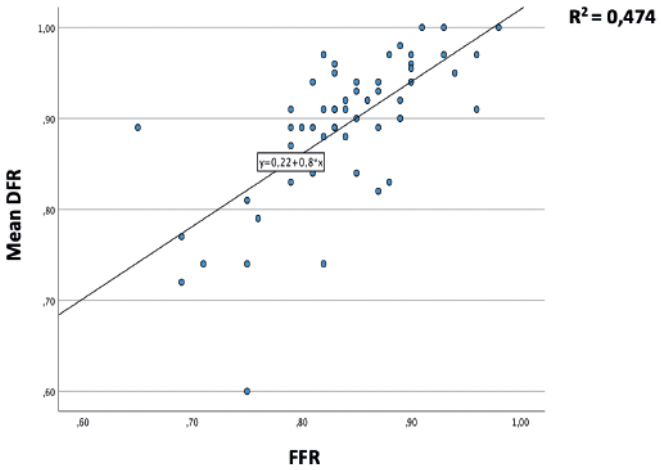


figure 4 : Scatter plots representing Pearson correlation coefficient

There was a 22,2% of discordance between rest and hyperhemia pressure gradients. In fact, there was 4 cases of positive dPR and negative FFR in the NAVVUS group, while 7 cases were found in the COMET group. One case of positive FFR and negative DFR was found in the COMET group versus none in the NAVVUS group.

Coronary artery physiological assessment includes multiple parameters. Positive FFR measures are mainly related to coronary artery percentage of stenosis and coronary artery calcifications with a respective p value of 0,010 and 0,036 ($\chi 2$). Coronary artery stenosis length and reference diameter were not associated to a significant FFR value.

Coronary flow assessment led to revascularization of 84 (43.5%) coronary artery stenoses, treated either by coronary artery stenting or cardiac surgery in case of multiple vessel disease.

Pressure drift is an important factor to consider during FFR measurements. In 8 cases among 66 coronary artery lesions there was a pressure drift, 5 in the NAVVUS group and 3 in the COMET group. Mean pressure drift was higher in the COMET group (0,0149mmHg) but not reaching statistical significance (p=0,060)

No complication happened with the two FFR devices.

DISCUSSION

The crossing ability of a coronary device is determined by its capacity of crossing a vascular resistance area and is defined as the diameter of the smallest aperture that a catheter can cross

This device characteristics is essential because it determines the feasibility and the security of a coronary artery revascularization procedure.

The Fractional flow reserve was first introduced by De Bruyne, Pijls et al who proved the ischemia cut off of FFR with non-invasive stress test. FFR based revascularization has excellent clinical outcomes either when the revascularization indication was deferred or indicated [3].

The DEFER trial investigated the appropriateness of the deferral of stenting a functionally non-significant coronary stenosis and showed the safety to defer a PCI in cases of FFR > 0,75 [10].

The FAME I trial by Tonino & al showed that FFR-guided PCI is associated with lower MACE and resource utilization compared with angiography-guided PCI in patient with multivessel disease using a threshold of 0,80 preferred nowadays. [6].

B. De Bruyne et al proved in the FAME II trial that the addition of FFR measurement to optimal medical therapy in patients presenting stable coronary artery disease is superior to best medical therapy alone [11].

All these major trials support the class IA recommendation to assess the hemodynamic relevance of intermediate coronary artery disease by FFR and as class IIa B in multivessel disease evaluation [4]. In the context of NSTE-ACS FFR guided revascularization of non-culprit lesions may be used during the index procedure to evaluate the need for further revascularization therapy [12].

NHPR have been more recently studied.

Among the advantages of NHPR are the drug-free approach and the shorter procedure time.

Instantaneous wave free ratio (iFR) is an NHPR index that evaluates the average ratio of Pd/Pa during the wave free period (WFP). This period represents a period of the cardiac cycle (diastole) when the coronary artery resistance is minimal and stable and is the average Pd/Pa from 25% into diastole until 5 ms before its end [13]. Multiple trials have validated the use of iFR for the functional assessment of coronary artery lesions [8, 14, 15].

Other NHPR have been investigated. The pressure gradient can be evaluated either over the entire cardiac cycle (Pd/Pa; RFR) or the diastolic phase (DPR; dPR; DFR). These indexes have been found identical to iFR in term of diagnostic performance with FFR a 77% diagnostic accuracy. The cut-off for these non hyperhemic indices is 0,89 with a proportion of discordance ranging between 15 to 20% particularly in proximal vessel subtending large myocardial areas [16].

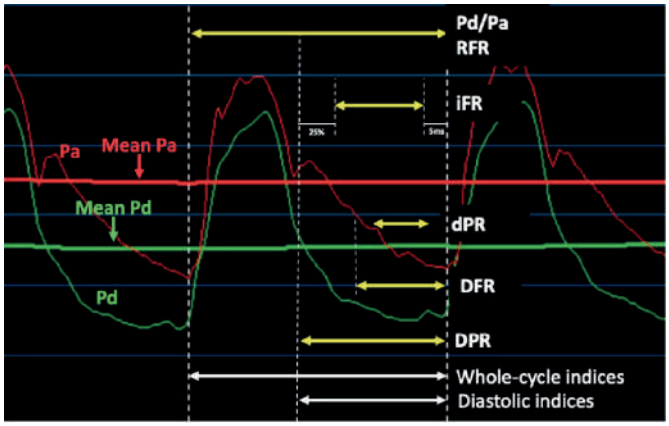


Figure 5 : Non hyperhemic pressure indices represented over cardiac cycle

In our study, NHPR was recorded in all the patients undergoing coronary angiography in 2022. The limited data of NHPR measurements represent a limitation for their evaluation in our study.

Generally, LM disease is frequently associated to other stenoses of the coronary artery tree. In these cases, FFR can stratify patients which can better benefit from a surgical revascularization but should consider downstream lesion implication. Thus, physicians should be aware of the, even modest, effect of serial stenoses or downstream coronary lesions either in the implicated vessel or the other coronary branch [17, 18].

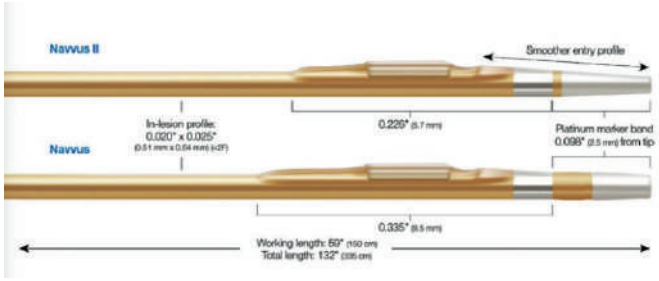
In our series FFR of LM stem was measured in 4,70 % of coronary angiographies, most of the time in both proximal LAD and LCx considering downstream lesions.

The NAVVUS Rxi system is a rapid exchange monorail fiber optic microcatheter that might avoid difficult pressure wire manipulation in tortuous vessels or across stent struts while maintaining the wire position safely during the whole steps of the procedure. It also reduces the procedure time, X ray exposition and the contrast usage as presented by Masdjedi et al in the CONTRACT trial [19].

Thus, the microcatheter does not require a specific pressure guidewire but can be delivered over standard wire. In fact, pressure guidewires generally are less performant and robust as dedicated guidewires. The fiber optic system is also superior for the reduction of pressure drift as compared with piezo-electrical system.

In the ACCESS-NZ trial, the microcatheter based FFR was well correlated to standard pressure wire systems and is considered as an alternative for measuring FFR with some potential advantages [20]. These previous findings have been supported by Diletti et al who report the same advantages of easier negotiation of coronary artery lesions and pull backs for serial measurements [21].

The ACIST-FFR study which have been conducted by Fearon et al found a statistically lower FFR value of 0,02 with no impact on clinical decision [22]. This difference can be explained by the microcatheter sensor diameter. As shown in the Figure 6, an improvement of 15% its crossing profile and 28% of its flexibility has been made on the NAVVUS Rxi II microcatheter.



In all these studies of the equivalence of the microcatheter system with wire-based FFR measurements, a proportion of the ACIST microcatheter could not cross the coronary artery lesions, on average 3% in the ACIST-FFR, CONTRACT and the FFR SEARCH studies [22–24]. C.Pouillot et al showed in a comparative study a risk of 23% of overestimation of the severity of CAD and a 12% of crossing failure [25].

Our results are in line with these previous studies and the meta-analysis of Henry Seligman et al who found an 18% diagnostic reclassification risk and 7,1% crossing failure rate with the NAVVUS microcatheter [26].

Conclusion

The functional assessment of the severity of coronary artery disease is nowadays considered the standard of care before PCI. The studied microcatheter presents some potential advantages offset by major drawbacks.

It is too frequently associated to a crossing failure risk in tortuous and calcified vessels. This microcatheter diameter, even if improved with the second generation of NAVVUS, is responsible of a potential overestimation of FFR in ambiguous lesions in small diameter vessels.

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Transvenous temporary pacing in complete atrioventricular block: A luxury of choice or an urgent need?

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Abstract

Introduction: Transvenous Temporary cardiac pacing (TV-TP) is commonly used in patients with life- threatening brady arrythmias, in order to provide temporary ventricular rate support. It's often used in emergency situations and for older patients in poor general condition who are hemodynamically unstable, serving as a bridge to implantation of a permanent pacemaker.
Methods: We reviewed the indications and complications associated with TV-TP insertion in patients with complete atrioventricular block, over a six months period (March 2022 - August 2022) at Ibn Sina hospital.
Results: we identified forty- eight patients with complete AV block of degenerative origin, TV-TP accounted for fourteen insertions (29%); (57.2%) women and (42.8%) men, with a mean age of 75.6 years.
TV-TP were undertaken because of severe symptoms, the leading symptoms being syncope, light- headedness, dyspnoea and fatigue. Additionally, two patients presented cardiac collapse. The median ventricular rate was 27 beats per minute.
Potential complications included femoral vein thrombosis, intermittent loss of capture and delirium.
Conclusion: In our study, about 29% of the patients presenting with degenerative complete AV block required temporary emergency pacing for initial stabilisation, mostly severely symptomatic, yet compromising in two patients. Complications are infrequent but not uncommon, thus, Clinicians should seek and implement strategies to mitigate them.

Keywords: Transvenous pacing, Temporary pacing, atrioventricular block, bradyarrhythmia

Introduction

It is over 30 years since Zoll externally paced the heart and 25 years since Furman and Robinson described the use of a transvenous right ventricular endocardial pacing electrode in the management of complete heart block. (1)
Although there are several types of temporary cardiac pacing (transcutaneous, transesophageal), the most widely used is transvenous (2).
Temporary pacing can serve as a bridge to a permanent device or recovery (3).
Current ESC indications for temporary pacing are limited to the emergency treatment of patients with severe bradyarrhythmia causing syncope and/or haemodynamic compromise refractory to intravenous chronotropic drugs. (4)
The aim of the present study was to determine the clinical and electrocardiographic characteristics of patients with complete atrioventricular (AV) block who required placement of a temporary pacemaker at our hospital, and lastly to compile data on the types of related complications.

MATERIALS AND METHODS

This study was conducted in the Department of Cardiology at Ibn Sina Hospital, Rabat.
We undertook a prospective survey of patients admitted for complete AV block, requiring temporary transvenous pacing, to review our indications for pacing and the incidence of complications. During a six-month period.
48 patients with complete atrio-ventricular block were enrolled between March 2022 and August 2022 and were followed from hospitalization to Pacemaker implantation. We excluded patients admitted for an AV block associated with myocardial infarction.
Variables included in our analysis were number of patients, age, gender, clinical symptoms, electrocardiographic characteristics, AV block aetiology, temporary transvenous pacing indication, complications following temporary pacing, only complications directly attributed to the temporary pacemaker being reported.
Relevant data were later represented in an Excel spreadsheet to generate tables.

RESULTS

This study included forty- eight patients with complete AV block, that was not linked to acute myocardial infarction.
In all patients, complete AV block was related to degenerative changes in the conduction system. Clinical symptoms reported were mainly light-headedness, syncope, dyspnoea and fatigue.
14 patients (29%) have been subject to temporary transvenous pacing. Of these patients, 8 patients (57.2%) were females and 6 (42.8%) were males. Most patients were of an advanced age, with a mean age of 75.6 years and a patient age range of 57-88 years.
Eight of these patients exhibited recurrent syncope, and four patients, light-headedness. Cardiac arrest requiring cardiopulmonary resuscitation occurred in two patients.
TV-TP was instituted using the femoral route, thus avoiding the potential complications associated with the subclavian approach, and, unlike the jugular approach, in order to permit easy compression in case of haemorrhage. All temporary pacings were done under fluoroscopic guidance, except for one, that was echocardiography-guided in an emergency setting.
The mean ventricular rate at the time of TTP placement was 27 beats per minute.
Complications were observed in three patients, namely, femoral vein thrombosis and intermittent loss of capture, one patient removed his pacing lead secondary to delirium.

DISCUSSION

Temporary transvenous pacing (TV-TP) is an emergency intervention primarily used to correct compromising bradycardia that is unresponsive to drug therapy. It involves stimulation of the endocardial surface of the RV apex using an electrode tipped temporary pacing lead which is inserted through a large central vein sheath. (5)
Temporary pacing is required in approximately 20% of patients presenting to the emergency department with symptomatic bradycardia (6)
According to ESC guidelines, the use of temporary pacing should be limited to the emergency treatment of patients with severe bradyarrhythmia causing syncope and/or haemodynamic compromise, and to cases in whom those bradyarrhythmias are anticipated. (4)
The main findings of our analysis are that of the 48 patients presenting with compromising
AV block, about 29% required temporary emergency pacing for initial stabilisation, to undergo a permanent pacemaker at a later time. All of these patients were symptomatic and exhibited many episodes of syncope and/or light-headedness, two of them showed signs of hemodynamic compromise. TV-TP was not considered in asymptomatic patients with stable escape rhyth.
Therefore, the indication was mainly based on severity of symptoms and ECG characteristics.
Rate of complications in this study was about 10%. Accordingly, detailed information regarding this aspect is essential to determine the true situation of temporary pacing in our setting.
Patients, who undergo TV-TP, have a high risk for procedure-related complications (e.g. cardiac perforation, bleeding, malfunction, arrhythmias, and accidental electrode displacement) and complications related to immobilization (e.g. infection, delirium, and thrombotic events). (4)
Complication rates following TV-TP therapy remain high despite the acquired experience over time, yet display a wide range amongst studies potentially related to specialist experience and quality of imaging systems used during implantation. The mean reported complication rates have remained high (23%) over the past decades, nonetheless, it has shown a significant decline. An analysis performed in the United States between 2003 and 2014 included 43,472 patients and showed an increasing trend in TV-TP related periprocedural complications up to 17.7% in 2014. An even larger study reporting on outcomes of TV-TP in the United States included over 350,000 patients and used the same database for the analysis. (7)
The aim of our study is to mainly standardize the indications of TV-TP in complete AV block, in order to pre-empt situations of hemodynamic compromise. General indications to consider TV-TP were Severe symptoms and a low mean ventricular rate.
Nevertheless, TV-TP does not come without its drawbacks, especially since it is invasive in nature, and complications can arise from a variety of causes.
Henceforth, we suggest an algorithm to show when to consider TV-TP or conservative management

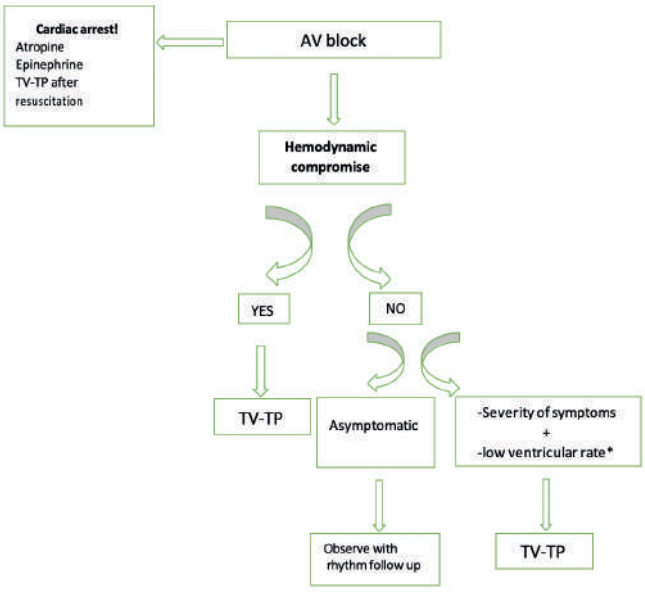

Figure. An algorithm to consider in the treatment of a patient with severe bradycardia

CONCLUSION

Temporary pacemakers are a necessary armamentarium for the acute treatment of compromising brady- arrythmias and they were indispensable in 29% of the cases of complete AV block, thus providing a bridge to permanent pacing. Its implementation, though, requires experience in cardiac pacing, in order to minimize the complications that remain relatively high.

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Initial electrocardiographic profile of the population of tangiers morocco : Infected with sars cov-2: about 1087 cases

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Abstract

INTRODUCTION :Coronavirus disease 2019 (COVID-19) is a pathology which initially affects the respiratory system, but also many other noble organs due to his inflammatory phase (Cytokine Storm), especially the cardiovascular system.
The cardiovascular risk factors present in a population infected with SARS-COV 2 are of particular interest.
The ECG is a fast available means to get an idea about the cardiac status. This permits not only to diagnose an unknown pre-existing pathology but also to detect a killing cardiac complication of the SARS COV-2 infection.
METHODS AND MATERIALS: We performed a cross-sectional study on COVID-19 patients passing through Tangiers sorting centre ; Clincal characteristics and ECG variables were manually abstracted from the electronic health record and first ECG.
1087 patients who presented to the COVID 19 triage center in Tangier-Morocco were systematically given a pre-treatment ECG before deciding on the type of management: outpatient, ward, intensive care.
RESULTS AND DISCUSSION: The mean age was 42.78 years, 30.5% of the cases had at least one cardiovascular risk factor, 8.6% of the patients were followed for hypertension, 8.2% for type 1 or 2 diabetes, 10.9% of the patients were obese with a BMI greater than 30, and 26.4% of the patients were either men over 50 or women over 60.
The mean heart rate was 80.89 bpm ± 15.58; The mean PR interval was 149.51 ± 21.70; The mean QRS duration was 98.59 ms ± 11.71; The mean QTc interval was 406.62 ms ± 24.32.
We found: A conduction disorder in 11.1% of patients, 1.6% of 1st degree AV Block, 2.5% of incomplete right bundle branch block, 5.7% of complete RBBB, 0.9% of LBBB and 1.4% of left anterior hemiblock
A rhythm disorder in 5.1% of our patients, 2.1% of ventricular extrasystole, 1.6% of supraventricular extrasystole, 1.1% of atrial fibrillation, wolf-parkinson-white syndrome in 0.3% of patients and 0.5% of Brugada pattern.
A repolarization disorder in 5.2% of our population. 3.6% of patients had negative T waves and 1.6% had ST segment abnormalities.
We also found a significant association between the presence of cardiovascular risk factors and electrical abnormality.
CONCLUSION
We found that the majority of ekg were normal and all critcally ill patients had a large specturm of EKG abnormalities .
We were able to describe the electrical parameters of our population and have an idea of the association between cardiovascular risk factors and electrical abnormalities .
Pending the results, we still believe that we can potentially establish a severity score including EKG to predict inpatient mortality in moroccan covid-19 patients .

Keywords: Electrocardiogram, Covid-19, Electrical abnormalities, Cardiovascular risk factor

Introduction

• SARS COV-2 (COVID-19) infection is a pathology that initially affects the respiratory system, but also in its inflammatory phase or by direct involvement the cardiovascular system.
• Initially, all patients infected with SARS COV-2 were either hospitalized or quarantined in dedicated units.
• With the sharp increase in the number of cases, it was decided to create triage centers for COVID-19 patients.
• The protocol at the COVID-19 triage center in Tangier includes:
• Patients' history and cardiovascular risk factors.
• Complete clinical examination.
• 12-lead surface ECG for the administration of chloroquine or hydroxychloroquine therapy.
• The ECG is a quick and available way to get an idea of the cardiac status.
• It allows the diagnosis of unknown pre-existing pathology and the search for a fatal cardiac complication of COVID-19.
• Routine ECG at the triage center in Tangier.
• The vast majority of cases develop minor forms of the infection.

Aim of Work

• Describe the electrical parameters of our study population.
• Compare the prevalence of electrical abnormalities in our population with those of studies concerning the general population and with those of the SARS-CoV 2 infected population.

Methods and Materials

STUDY TYPE:
Cross-sectional observational epidemiological study
Period from 17/08/2020 to 18/09/2020
Inclusion criteria:
• All patients over 18 years old who consulted at the COVID-19 Triage Center in Tangier.
• Asymptomatic patients or patients with minor symptoms of the disease.
Exclusion criteria:
• All patients under 18 years of age, a history of heart disease, or developing severe symptoms of the disease.

INFORMATION GATHERING:
The analysis was done on an operating sheet from health ministry.
ANALYSIS OF RESULTS:
IBM SPSS version 21 software
RESULTS:
Gender:
Of the 1078 patients, 40.1% were female and 59.9% were male.
Age:
The mean age was 42.78 years with a standard deviation of 15.35 and a median equal to 41 years.
The minimum age was 18 years while the maximum age was 83 years
Cardiovascular risk factors:
69.5% of patients had no cardiovascular risk factors.
• 15.7% had 1 cardiovascular risk factor.
• 8.1% had 2 cardiovascular risk factors.
• 4.8% had 3 cardiovascular risk factors.
• 2% had 4 cardiovascular risk factors.
Medical history:
Of these patients, 321, or 30.5% of cases had at least one cardiovascular risk factor:
• 8.2% of patients were followed for type 1 or type 2 diabetes.
• 8.6% of patients were being followed for hypertension.
• 10.9% of patients were obese with a BMI greater than 30.
• 26.4% of patients were either male or female over 50 or 60 years old.

ELECTROCARDIOGRAPHIC PARAMETERS:

Electrical parameter	Average	Standard deviation
Heart rate	80,89	15,58
QRS	98,59	11,71
PR	149,51	21,70
QTc	406,62	24,31

ELECTRICAL ABNORMALITIES:
Conduction Disorders:

Conduction disorder(N=1078)	Number	Percentage
ATRIOVENTIRICULAR BLOC 1 degree	17	1,6
RBBB c	27	2,5
RBBB i	61	5,7
LEFT ANTERIOR HEMIBLOC	15	1,4
LBBB	10	0,9

Repolarization disorders:

Repolarization disorder	Number	Percentage
Elevation ST	11	1
Segment depression	7	0,6
Negative T wave	39	3,6

Rhythm disorders:
• Ventricular extrasystoles found in 23 patients, or 2.1% of our patients.
• Supraventricular extrasystoles found in 17 patients, that is 1.6% of our patients.
• Atrial fibrillation was found in 12 patients, i.e. 1.1% of patients.
• Wolff-Parkinson-White syndrome was found in three patients, i.e. about 0.3% of our patients.
• Brugada syndrome in five patients, i.e. 0.5% of patients.

Discussion

• Comparison of the prevalence of cardiovascular risk factors in our population with figures from the Moroccan Ministry of Health:
• In a national survey conducted by the Moroccan Ministry of Health, for the years 2017 and 2018, on common risk factors of non-communicable diseases, the prevalence of hypertension is 29.3%, obesity (BMI>30) is found in 20% of the Moroccan population while the prevalence of diabetes is 10.6%.
• Concerning the age-sex factor, according to the Moroccan High Commission for Planning, men over 50 years of age represent 19.5% of cases, while 10.37% of Moroccan women are over 60 years of age.
• In our study, the age-sex couple is the first cardiovascular risk factor found in 26.2% of patients, followed by obesity in 10.9% of cases, hypertension in 8.6% of cases and diabetes in 8.2% of cases.

Comparison of electrocardiographic data from our study population with those from healthy populations and populations hospitalized for COVID-19 impairment:
Comparative results of PR, QTc, QRS and conductance disorders:

PR interval:

Study	Reach with COVID-19	Number of patients	Mean PR interval
Our study	Yes	1078	149,51 ± 21,7
Jay W Mason	No	79743	159 ± 26
Ait Abdellah	No	200	152,76 ± 27,94
Matteo Bertini	Yes	431	161 ± 33

AV Block 1 degree:

Study	Reach with COVID-19	Number of patients	Percentage of BAV1
Our study	Yes	1078	1,6%
D BACQUER	No	**47358**	**0,2%**
LUCA BERGAMASCHI	yes	269	4,4%
S. ANDREW McCullough	Yes	756	2,5%

QRS:

Study	COVID-19 Reach	Number of patients	Mean QRS
Our study	Yes	1078	98,59 ± 11,71
Jay W Mason	No	79743	94 ± 15
Ait Abdellah	No	200	81,9 ± 22,58
Luca Bergamaschi	Yes	269	93(85-105)
Matteo Bertini	Yes	431	99 ± 23

Left anterior Hemibloc:

Study	COVID-19 Reach	Number of patients	Percentage
Our study	Yes	1078	1,4%
Luca Bergamaschi	Yes	269	8,8%
Matteo Bertini	Yes	431	7%

QTc :

ETUDE	Reach with COVID-19	Number of patients	Average
Notre étude	yes	1078	406,62 ± 24,32
Jay W Mason	No	79743	412 ± 26
AIT ABDELLAH Somaya	No	200	390,76 ± 44,79
Matteo Bertini	yes	431	386 ± 62
Luca Bergamaschi	yes	269	440(422-465)

Left Bundle Branch Block:

STUDY	Reach with COVID-19	Number of patients	Percentage
Our study	Yes	1078	0,9%
D OF BACQUER	No	47358	0,5%
Matteo Bertini	Yes	431	4%
Luca Bergamaschi	Yes	269	2,8%
S. Andrew McCullough	Yes	756	1,5%

Comparative results of heart rate and rhythmic abnormalities:
Heart Rate:

ETUDE	Reach with COVID-19	Number of patients	Average
Our study	Oui	1078	80,89 ± 15,59
Jay W Masson	Non	79743	68 ± 12
AIT ABDELLAH Somaya	Non	200	74,91 ± 12,54
Matteo Bertini	Oui	431	87 ± 24
Luca Bergamaschi	Oui	269	78 (69–89)
S. Andrew McCullough	Oui	756	90 ± 19

Ventricular extrasystole:

Study	Reach with COVID-19	Number of patients	Percentage
Our study	Yes	1078	2,1%
S. Andrew McCullough	Yes	756	3,4%

Supraventricular extrasystole:

STUDY	Reach with COVID-19	Number of patients	Percentage
Our study	Yes	1078	1,6%
S. Andrew McCullough	Yes	756	7,7%

Wolff-Parkinson-White syndrome:

STUDY	Number of patients	Percentage
D De Bacquer	47358	0,09%
Our study	1078	0,3%

Atrial fibrillation:

STUDY	Reach with COVID-19	Number of patients	Percentage
Our study	Yes	1078	1,1%
D De Bacquer	no	47358	0,49%
Matteo Bertini	Yes	431	22%
Luca Bergamaschi	Yes	269	9,3%
S. Andrew McCullough	Yes	756	5,6%

Brugada-LIKE:

STUDY	Reach with COVID-19	Number of patients	Percentage
Our study	Yes	1078	0,5%
SANDEEP S. PATEL	no	162 590	0,012%
Shaobo Shi	no	558689	0,03%+0,42%

Negative T waves:

STUDY	Reach with COVID-19	Number of patients	Percentage
Our study	Yes	1078	3,6%
Matteo Bertini	Yes	431	14%
S. Andrew McCullough	Yes	756	10,5%

ST-segment abnormalities:

ETUDE	Reach with COVID-19	Number of patients	Percentage ST abnormality	Percentage over-shifted	Percentage under offset
Our study	Yes	1078	1,6%	1%	0,6%
D De Bacquer	No	47358	2.38%		
Luca Bergamaschi	Yes	269	5,6%		
S. Andrew McCullough	Yes	756		0,7%	

Limitations of our study:

• Some electrical abnormalities were not studied (Deviation of the cardiac axis, Left and right ventricular hypertrophy, Electrical microvoltage or pathological Q waves).

• The operating form set up by the triage center did not include all the cardiovascular risk factors (dyslipidemia, etc.) or was not correctly filled out with regard to smoking.

• The data having been collected at the level of a triage center for COVID-19 patients, the follow-up of patients having presented certain major electrical anomalies was done at the level of different cardiological centers and we do not know their fate.

Conclusion

• The COVID-19 pandemic affected the entire population in a non-selective manner, including young and elderly subjects, healthy subjects and subjects being followed for heart disease, and subjects with or without cardiovascular risk factors.

• In Morocco and more specifically in Tangier, an electrocardiogram was performed in all patients who contracted the disease, which allowed us to map the electrocardiographic profile of the local population. This allowed us to have an idea of the prevalence of several electrical anomalies.

• In addition, the history taken systematically in these patients allowed us to carry out a mass survey of the cardiovascular risk factors in the Tangier population.

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Clinical inertia: pharmacological management of hypertension

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Abstract

Hypertension is known to be an important and remediable risk factor for cardiovascular disease (CVD). Recently, therapeutic inertia has been identified as one of the main factors contributing to the high rates of uncontrolled hypertension. It is defined as physicians' failure to initiate or increase therapy even though treatment goals are unmet. A good understanding of the determinants of this phenomenon will lead to better management of hypertension and therefore better blood pressure control. This study aims to evaluate therapeutic inertia in the management of hypertension among Moroccan general practitioners.

Keywords: blood pressure, hypertension, general practitioner, therapeutic inertia clinical inertia.

Introduction

The complications of hypertension account for over 10.8 million deaths per year worldwide [1]. It has been proven that good control of elevated blood pressure (BP) levels reduces the risk of cardiovascular complications including coronary heart disease, stroke and renal insufficiency [2].

In recent years, several guidelines have been issued by various scientific societies and organizations to ensure better management of hypertension [4], [5]. Moreover, considerable progress has been made in developing antihypertensive treatments. Nevertheless, despite the rising awareness of the debilitating consequences of uncontrolled hypertension, the global burden of this disease is still substantially high. Most hypertensive patients do not reach control according to the targets defined by the guidelines [6]. In most countries, the classical rule of halves still holds true. Only around 50% of hypertensive people are aware of their condition. Among them, less than 50% are treated and less than 50% of these latters have reached their blood pressure target [7].

Several explanations have been put forward in order to justify this gap between the guidelines and actual clinical outcomes. The responsibility of healthcare professionals has been brought to light recently through 'therapeutic inertia' (TI). It is defined as failure to initiate or intensify therapy even though the patients have not yet reached their target [8]. In fact, in a study conducted in sub-Saharan Africa, the rate of therapeutic inertia was up to 80% [9].

This demonstrates the magnitude of the issue and emphasizes the need for more data on TI in the management of hypertension.

The current study aims to explore clinical inertia in the pharmacological management of hypertension by Moroccan general practitioners, seeing as primary care is the cornerstone of its management.

Methods

We conducted a descriptive and analytical cross-sectional study, from October 2021 to January 2022, involving general practitioners from both the liberal and public sectors, throughout Morocco. The questionnaire used in order to assess TI in the management of hypertension was developed based on the latest recommendations and guidelines of the International Society of Hypertension ISH published in 2020 alongside the definitions of TI formulated by Okonofua et al. [10] and Lebeau et al. [11]

The data was collected through a standardized anonymous questionnaire designed using the 'Google Forms' platform. The survey was then distributed via social media networks (various general practitioners' Facebook and Whatsapp groups).

The survey was divided into two parts: the first part covered characteristics and information concerning the physicians (age, sex, number of consultations per day…). The second part covered mainly the sources used to update their knowledge about hypertension and the different reasons for TI. Moreover,

the GPs were presented with five different clinical scenarios in which therapeutic goals were not reached. We adjusted a different variable in each scenario and evaluated the GPs' responses. The first scenario was one that is usually associated with TI: young age, a normal BMI and absence of other CVRF (cardiovascular risk factors). The second scenario was identical to the first except for a change in the age of the patient (68years instead of 48yrs). The third was identical to the previous except for the addition of diabetes in the patient's history. The fourth scenario was identical to the second one with only the addition of a history of ischemic stroke. Whereas the fifth concerned a situation requiring the initiation of antihypertensive medication (grade I hypertension with high CV risk)

We coded the physicians' responses to each scenario by assigning 1 point for each response reflecting inertia. We calculated the sum of the points for each practitioner which allowed us to obtain a score ranging from 0 to 5. Based on this score, we divided the physicians into two: a 'non-inertia group' and an 'Inertia group'.

Microsoft Office Excel 2019 was used for data entry and SPSS 21.0 software was used for statistical analysis. For descriptive results, quantitative variables were expressed using means with standard deviations and qualitative variables using counts and percentages. Then, a univariate analysis was performed using the Chi-square test or Fisher's exact test for the comparison of percentages. A p-value of less than 0.05 was considered significant.

This study was undertaken in compliance with Moroccan law and the Helsinki Declaration for the Protection of Personal Data. The anonymity and confidentiality of the GP participating in the study were respected.

Results

Descriptive findings :

A total of 130 general practitioners participated in the study by completing the survey. 62% of the physicians answering the questionnaire were female and 38% were male. The average age was 38±3.9 years. The majority (71%) were public sector physicians. The percentage of physicians who had practiced for 5 years or less was 51.5% vs 48.5% having practiced for more than 5 years. We noted that a median of 30 patients per day was seen by the GP with an interquartile range of [15, 50]. The average medical visit time reported by the GPs was estimated at 11.88 ± 7.03 minutes. The vast majority (95%) opted for monotherapy when asked what drug they usually use to initiate an antihypertensive treatment. Only 5% chose a two-drug therapy. Moreover, the general practitioners reported that the two main sources they refer to in order to update their knowledge concerning hypertension were mainly taking part in medical conferences or courses (26.2%) as well as referring to official recommendations such as the ISH (26.2%).

Based on the different clinical scenarios presented in the survey, the frequency of therapeutic inertia among general practitioners was estimated at 78.5% CI 95% [70.4-85.2]. This frequency varied between the different five scenarios. It was estimated accordingly (from the first to the fifth scenario) at: 33.8%, 24.6%, 62.3%, 56.2% and 76.2%.

The two main reasons for therapeutic abstention reported by physicians were: the importance of improving patient compliance, lifestyle and dietary measures before intensifying treatment (81,5%) and the fact that the blood pressure measured in the office does not reflect the patient's "true" BP and doesn't need ambulatory monitoring (43,8%).

Analytical findings:

Significant associations between therapeutic inertia and physician characteristics were sought. The frequency of TI among practitioners aged ≤40 years old was 85.3%. While this frequency was 69.1% in those aged >40 years old. This difference was statistically significant (p=0.026). Thus, young age was a risk factor for inertia according to our results. The frequency of therapeutic inertia was more marked in the physicians who had practiced for 5 years or less (88.1%), versus (68.3%) in those who had practiced for more than 5 years. This difference was statistically significant with a p value of 0.006. Moreover, the higher the number of patients seen per day, the greater the tendency for inertia (p=0,028). The general practitioners who have reported spending 10 minutes or less per consultation exhibited a higher frequency of TI compared to those who spent more time with the patient (p=0.002). In addition, the association between the healthcare sector and TI was very statistically significant. The public sector physicians exhibited a higher tendency towards TI than those in private practice (p<0,001).

Table 1: The frequency of clinical inertia according to the characteristics of general practitioners.

	Therapeutic inertia		P value
	N	%	
Age			
≤ 40 yrs	64	85.3%	0.026
> 40 yrs	38	69.1%	
Healthcare sector			
Public	82	86.3%	<0.001
Private	20	57.1%	
Number of yrs in practice			
≤5 yrs	59	88.1%	0.006
>5 yrs	43	68.3%	
Number of patients per day			
≤30 patients	49	71%	0.028
>30 patients	53	86.9%	
Time per consultation			
≤10min	75	86.2%	0.002
>10min	27	62.8%	

Our results found that physicians who reported using the official recommendations (ISH, SFHTA…) in order to update their knowledge about hypertension presented less TI than those who resort to other means (information exchange with colleagues, medical journals…) (p=0.023). In addition, a correct knowledge of the rule of 3 (recommended by the FSHA for HBPM) was a protective factor for inertia (p=0.009). In the second clinical scenario, we found that by increasing the age of the patient therapeutic inertia decreased (24.6% vs 33.8% in the 1st scenario). Whereas in the third scenario, by adding diabetes as comorbidity, TI increased compared to the 2nd scenario (62.3% vs 24.6%). This frequency was also more important in the fourth scenario with the addition of a history

of 'ischemic stroke' (56.2% vs 24.6%). All these associations were statistically significant (p<0.05).

Table 2: comparison of therapeutic inertia frequencies

	Therapeutic inertia (%)	P Value
S2 vs S1	24.6% vs 33.8%	0.002
S3 vs S2	62.3% vs 24.6%	0.001
S4 vs S2	56.2% vs 24.6%	0.013

Discussion

To our knowledge, this is the first Moroccan study that evaluates TI in hypertension. Our results revealed a high level of inertia. Its overall frequency in our study was estimated at 78.5% CI 95% [70.4-85.2]. The studies conducted by Okonofua et al. [10], Fremeaux et al. [12] and Dalia et al. [13] also found high levels of inertia ranging from 43% to 87%. These variations can be due to the differences in the populations used in these studies in addition to the different methods employed to asses TI in each one of them.

- Patient characteristics associated with inertia :

Our results found that the advanced age of the hypertensive patient was inversely related to clinical inertia (p=0.002). Consistent with previous studies, TI was common in the elderly [17], [18]. This can be attributed to the fact that these patients usually present several other comorbidities which renders the physicians more vigilant. However, in contrast, this didn't apply to diabetic patients. Prior studies have also reported high rates of TI in patients with diabetes [13], [19], [20]. Whereas the studies conducted by Manze et al. and Fremeaux et al. [12], [21] didn't find any significant association between the two; A history of diabetes did not affect inertia. A history of ischemic stroke was also positively associated with inertia even though this normally would require exhaustive BP control. This is consistent with the results of a Spanish study conducted in 2011 [20].

As to the last scenario, a failure to initiate an anti-hypertensive drug therapy (in association with lifestyle changes) was noted in 76.2% of the responses. According to the International Society of Hypertension (ISH) it's recommended to initiate pharmacotherapy in grade 1 hypertension if high risk or if BP levels remain elevated after 3-6months of lifestyle interventions [4].

- General practitioner characteristics associated with inertia:

Our survey reached a mostly young population of GP (average age of 38.6 years). However, TI occurred most markedly in the group of 40years old or less (p=0.026). This could be due to them being less experienced than their older colleagues. In addition, our results found that a lower number of years in practice was significantly associated with higher inertia which could be related to the physicians' expertise as well. These results are consistent with those found by Dumas et al. [22] and Turchin et al. [23] whereas Bolen et al. [24] found no such association. In addition, the GPs who reported spending less time with the patient presented more inertia. This is inconsistent with the results of the Kerr et al. [25] study. This discrepancy can be due to the difference in the time slots used in the two studies. Moreover, a high number of consultations per day was also positively associated with inertia (p=0.028). In the study conducted by Turner et al. a high workload was associated with significantly lower adjustment of antihypertensive treatments [18]. We have found that GPs do not follow the recommended guidelines for managing hypertension. In fact, the ISH recommends the initiation of antihypertensive treatment with a dual low-dose combination. Monotherapy was to be considered in low risk grade hypertension or older patients (>80years) or frailer patients [4].

- Reasons for therapeutic inertia :

One of the main causes of inertia according to Phillips et al. [8] was the use of 'soft reasons' by the physicians to justify the lack of treatment intensification. Our survey confirmed the same. According to the results, GPs often focused on lifestyle changes and medication compliance rather than intensifying treatment when faced with uncontrolled hypertension. However, according to the guidelines, lifestyle interventions must be advised continuously in addition to pharmacological treatment [4], [5]. Therefore, if the patient is treated with antihypertensive drugs they should be adjusted accordingly and lifestyle interventions must not replace intensification of treatment.

The second most chosen reason for TI was that the BP measured in the office is nonrepresentative of the patient's "true" BP and doesn't need ambulatory monitoring. However, according to the guidelines, it is recommended to confirm the diagnosis of hypertension by out-of-office BP measurement (HBPM and/or ABPM) when feasible (IC) [5]. Multiple other justifications were reported by the GPs (Figure 1).

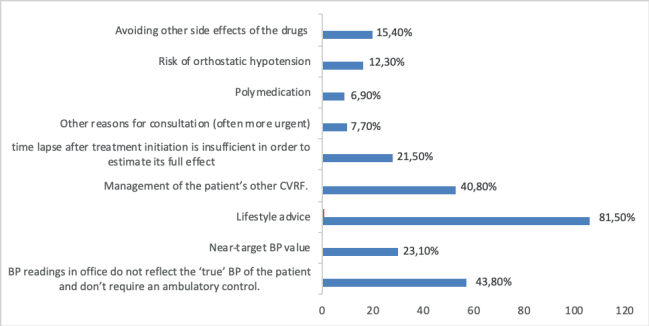

Figure 1: Reasons for GPs to not intensify therapy in patients with uncontrolled hypertension

The results of our study must be interpreted taking into account certain methodological limitations. This is a cross-sectional study involving only 130 general practitioners, who do not represent all Moroccan physicians. Moreover, the clinical scenarios used in our study may differ from real life situations and the use of a questionnaire provokes reflection on the GP's side that might thus bias his answers. Finally, since the survey was distributed online, we can't eliminate a volunteer bias.

Conclusion

Uncontrolled hypertension can be responsible of numerous severe and disabling cardiovascular complications. General practitioners play an important part in the management of this disease. Therapeutic inertia was lately identified as a huge impediment to achieving BP control. Our study successfully highlighted inertia in the treatment of hypertension among Moroccan general practitioners. Many reasons were offered by the physicians for not intensifying treatment. It is essential to differentiate between 'true clinical inertia' and 'appropriate inaction'.

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Prevalence of arrhythmias on 24 h ambulatory Holter electrocardiogram monitoring: from 24-h ambulatory Holter electrocardiogram register of Mohammed VI hospital of Marrakech.

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Background: The 24 h ambulatory Holter electrocardiogram (ECG) detect and quantify cardiac dysrhythmias in individual patients. It is particularly able to document bradyarrhythmic or tachyarrhythmic episodes which might be missed on normal 12 lead resting ECG recordings. It is, therefore, useful to identify patients with symptomatic or asymptomatic paroxysmal tachy/bradyarrhythmias.
Objective: The aim of this study is to present our findings on the prevalence of arrhythmias detected on the 24 h Holter ECG of relatively a large cohort of patients referred to the noninvasive unity of cardiology in university hospital center Mohammed VI of Marrakech over the last few years.
Methods: A total of 380 patients data was collected from the register of 24 h ambulatory Holter ECG in the non-invasive exploration unity of university hospital center Mohammed VI of Marrakech, From January 2019 to November 2021, consisting of 148 males and 232 females with a mean age of 56,31 ± 14,58
Results: The most common indication for Holter monitoring in this group was unexplained palpitations. Ventricular extrasystole was the most common arrhythmias found on Holter ECG. Only 9 out of the 380 patients had Holter ECG evidence of non-sustained ventricular tachycardia (VT). There was no significant difference in the prevalence of cardiac arrhythmias in males compared to their female counterparts. However, in the group of elderly patients (65 years and above), the prevalence of cardiac arrhythmias was significantly higher.
Conclusion: The study suggests that palpitation is the main indication for 24 h ambulatory Holter ECG test. It also showed that ventricular extrasystoles are the most common arrhythmias detected. In addition, it reinforces the fact that elderly patients were more likely to have cardiac arrhythmias compared to their younger people.

Heart failure with preserved ejection fraction: Association between the left atrium strain and the NT-ProBNP

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Background: Plasma concentration of NT-ProBNP is recommended as initial diagnostic test in patients with symptoms suggestive of Heart failure (HF) with preserved ejection fraction (HFpEF). The Peak atrial longitudinal strain (PALS) has been proposed as an alternative approach for left ventricular diastolic function assessment. Thus, we searched for a correlation between the PALS and the NT-ProBNP in patients with suspected HFpEF.
Methods: This is a prospective descriptive study that included 67 patients with suggestive symptoms of HF, explored in the cardiology department of the hospital of the internal security forces of Marsa and having consulted between November 2021 and Mars 2022.
Results: The mean age was 60±11 years, with a sex ratio of 0.76. Hypertension and obesity were the most common cardiovascular risk factors (80% and 51% respectively). Explorations objected a median NT-ProBNP of 76 mmHg [49-143] and a median PALS of 30.2 [23-32.4]. A value of NT Pro-BNP ≥125 pg/ml was found in 33% of the patients. In univariate analysis, PALS was significatively lower in patients with NT Pro-BNP ≥125 pg/ml (p= 0.02). In bivariate analysis, PALS was significatively and negatively correlated with NT-Pro BNP (p= 0.003, r= -0.36. The analysis of the Receiver operating characteristic curve showed that a value of PALS < 30.2 (sensibility= 63%, specificity= 77%) increases the likelihood of NT-Pro BNPI ≥125 pg/ml by 5.6 (OR= 5.6, 95% CI: 1.72-18.1).
Conclusion: PALS, easily measured by echocardiography, could be used as an alternative parameter in the diagnosis of HFpEF.
Keywords: Heart failure with preserved ejection fraction, NT-ProBNP, Left atrium strain.

Basal characteristics of the cardio-oncology registry of chemotherapy induced cardiovascular toxicity: about 2329 patients

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Background: Chemotherapy have improved the prognosis of many cancers in the last years but concerning cardiovascular toxicity (CVtox) have been reported. Nowadays, specific surveillance protocols are recommended, and early diagnosis of toxicity is crucial but may be challenging.
Purpose: To characterize the cardiovascular (CV) effects of chemotherapy and to identify cardiovascular risk factor in cancer patients
Methods: A monocentric registry was developed by collaboration of the cardiology and oncology department since 2017. A total of 2 329 patients was included. A follow-up protocol was stablished with clinical, electrocardiographic (EKG), echocardiography, and laboratory assessment, including cardiac biomarkers. Toxicity is managed according to ESC.
Results: 2329 patients were currently included. Median age was 52 [35, 80] years-old, 91% were female. 65% had at least 1 CV-risk factor (75% menopause 16% hypertension , diabetes mellitus 11%, 10 % hyperlipemia, 7% smoking history) and up to 4% had previous known CV disease . Dyspnoea was referred by 16% of patients, 18% have abnormal EKG findings and one-third (2%) abnormal cardiac biomarkers. Mean LVEF (58% and GLS (-18[-19.75, -15]) were within the normal range but 14% of whom LGE were measured showed reduced value at baseline. Cancer characteristics are meanly represented by breast cancer 71% ; digestive 10% ; hematological/lymphoma 9% , .
Conclusion: Real-world cancer patients show a high CV risk profile and non negligeable CV diseases before ICI treatment. The prospective follow-up of this cohort were personalized according to baseline risk and the chemotherapy planned to detect early stages of cardiotoxicity.

Assessment of left diastolic function in patients with metabolic syndrome

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There are several definitions of metabolic syndrome, but it is most commonly diagnosed when ≥ 3 of the following criteria are present: excess abdominal fat , high fasting blood glucose , hypertension, high triglycerides , low HDL cholesterol. The incidence of metabolic syndrome often parallels that of obesity and type 2 diabetes. It is very common; in the United States, > 40% of people > 50 years of age may have metabolic syndrome.
The aim of this study was to assess left diastolic function by echocardiographic parameters in patients with metabolic syndrome without known cardiovascular disease.
This study included 125 people who were divided into two groups with a similar mean age, a group with metabolic syndrome n=60 with an age: 63+/-1.7 years and a group without metabolic syndrome n=65, age: 60+/-2.3 years)
Left ventricular wall thickness, LV mass were calculated according to the TM mode. The ejection fraction was calculated in simpson biplane. LV diastolic function was assessed by fast filling rate (E-rate), atrial systolic rate (A-rate), and E/A ratio by analyzing the transmitral flow. The Tei index, which reflects both diastolic and systolic LV function, was also calculated. In the metabolic syndrome group, LV wall thickness and LV mass were higher ($p<0.001$), there was no significant difference in LVEF between the two groups. However, mitral flow parameters and Tei were significantly different between the metabolic syndrome (0.64+/-0.12 and 0.39+/-0.06, respectively) and non-metabolic syndrome groups (0.9+/-0.23 and 0.28+/-0.07) ($p<0.001$), independent of the presence of LV hypertrophy.
These results indicate that the metabolic syndrome is related to the presence of diastolic cardiac dysfunction independently of LV hypertrophy and systolic dysfunction.

High risk pulmonary embolism: Management in CHU Ibn Rochd cardiology intensive care unit

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Introduction : High-risk acute pulmonary embolism (PE) is related with a high mortality risk approaching 25% and remains defined by shock or hypotension. Those numbers make it an urgent diagnosis by favoring examinations in the patient's bed and fast therapeutic strategy. The aim of this study was to describe the clinical features of patients admitted for acute high-risk PE, the main findings, the therapeutic strategy and their prognosis.
Methods : Aa retrospective study conducted on 182 patients hospitalized in our intensive care unit for PE between January 2016 and October 2018, including 37 with acute PE at high risk.
Results: The average age of the patients with cardiogenic shock was 66.9 years, with a standard deviation of 15.6; with a higher frequency in the elderly > 70 years (P = 0.06). The sex ratio (M/F) was 0.39, the risk factors for venous thromboembolism were not different from the non-shock group. Respiratory distress chart with SpO2 < 95%, arterial hypotension < 90 mmHg systolic and tachycardia > 100bpm in 88% of cases (P = 0.003) were the main features in the clinical presentation. Electrically, no differences were found between the two groups. Echocardiography was fundamental in the diagnosis and permitted the early thrombolysis without further delay. Thrombolysis was used in 80% of patients (P < 0.001), treatment with non fractionnal heparine, dobutamine was initiated in 49% of cases (P < 0.01). Mortality was 41% compared to 7% in the non-shock group (P = 0.026).
Conclusion: Despite rapid management and treatment thrombolytics and vasoactive drugs, high-risk acute PE remains a poor prognosis with significant intra-hospital mortality.

The impact of prior antithrombotic use on thromboembolic events in patients with cardiovascular disease and severe COVID-19 infection

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Objective: Our objective in this study is to determine the predictive factors of thromboembolic complications in patients with previous heart disease and severe covid-19 infection and the impact of previous use of antithrombotic drugs on protection against these complications.
Methods: We conducted a single-center retrospective study of 158 patients with heart disease admitted to an intensive care unit for severe SARS-COV-2 infection. To determine the predictive factors, we used a logistic regression analysis.
Results: Out of 158 patients, 22 were complicated by a thromboembolic event, i.e. 13.9%, mean age of our population was 64.03 (SD = 15.27), with a male predominance of 98 (62%), For the predictive factors of thromboembolic complications, and after multivariate analysis, we find the duration of hospitalization with (OR=0.92 ; 95%CI (0.863 - 0.983), p=0.014, previous use of anti-thrombotic drugs as a protective factor with (OR=0.288, 95%CI (0.091 - 0.911), p=0.034 for anti-platelet agents) and (OR=0, 322, 95%CI (0.131 - 0.851), p=0.021) for anti-coagulants (Figure1), and finally thrombocytopenia at admission as a risk factor (OR=4.58 95%CI (1.2 - 10.627), p=0.021). D-dimer was not detected as a risk factor, and this can be explained by the characteristics of our population. Although the previous use of anti-thrombotic drugs protects against thrombo-embolic complications during severe infection, there was no benefit in terms of mortality (Figure2).
Conclusion: Prior use of antithrombotic drugs is a protective factor against thromboembolic complications in patients with a history of heart disease but has no effect on mortality.

The changing face of infective endocarditis over time: Over 30 years comparative study

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Introduction : Infective endocarditis(IE)is an evolving disease with a persistently high mortality and morbidity,it is a rare disease for which diagnosis and treatment continue to develop.
The purpose of our work is to review our experience with IE and to analyze the evolution in its epidemiologic,clinical and microbiologic characteristics,as well as the outcomes.
Methods : The aim of this study is to compare data from a retrospective study conducted in Ibn Rochd Hospital between January1983 and December1994,by Bennis and Al based on 157 cases of infectious endocarditis admitted which we referred to as GroupA;and 122 cases of infective endocarditis according to Duke criteria admitted to the same center three decades after,from December2013 to June2022,which are referred as GroupB.
Results : Concerning the demographic profile:The mean age of the patients increased, with a mean of 40.3 years in the groupB vs 27.5 years in the groupA, with a male predominance(62.8% in groupA vs60.7%in groupB)
Infectious endocarditis secondary to rheumatic valvular heart disease has significantly decreased from 63%of patients in groupA to28.1%in groupB. The valves most frequently involved were the mitral and aortic valves in both groups with an increase of mechanical prosthetic valve involvement with10.4%in groupB.
A portal of entry was identified in63%of patients in groupA vs42%in groupB,with a significant decrease of dental-related cases from 64% in groupA to28%in groupB.Concerning the pathogens causing IE:In groupA,blood cultures were positive in42%of cases with a predominance of Staphylococci(30%)and coagulase-negative Staphylococci(25.7%of cases) whilst in groupB blood cultures were positive in32%of cases with a predominance of Staphylococci(38.6%)followed by Streptococci(21%)
Echocardiography including the transesophageal approach is crucial in the diagnosis of IE by demonstrating specific lesions of IE(abscess or vegetations)in73.2%of cases in groupA and84%in groupB.
The major complications of IE in groupA were congestive heart failure CHF(47.8%)or neurological lesions(11.5%)while in groupB CHF was noted in36.4%of cases and8,3%of neurological lesions.The overall mortality in our series(GroupB) was16%vs28.7%in groupA mostly related to cardiogenic shock.
Conclusion: IE remains a highly mortal disease,it's epidemiology and management are continually changing.These changes should be considered at the time of decision-making in treatment of and prophylaxis for IE.

Toxic cardiomyopathy due to Trastuzumab's use in breast cancer patients in the cardio-oncology unit of Casablanca

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Introduction: Trastuzumab has led to a significant improvement in the treatment of both advanced and early breast cancer that over-expresses HER2 receptors. However, it is associated with an important cardiotoxicity that requires a systematic monitoring of left ventricular ejection fraction (LVEF) before and during the treatment. We present our experience with patients who developed trastuzumab-related cardiotoxicity.
Purpose : To evaluate the incidence and the reversibility toxic cardiomyopathy induced by trastuzumab in our cardio-oncology unit.
Methods : We conducted a prospective observational study from January 2017 to June 2022 in the cardio-oncology unit of Casablanca, Morocco.
Results: 1583 patients were included. The average LVEF before initiation of trastuzumab was 59,9±11,2% and 51,9±6.6% at the end of treatment. A decreased LVEF was detected in 58 patients (3.6%), symptomatic in 30 cases, asymptomatic in 28 patients. Cardiotoxicity occured for a mean cumulative dose > 40mg/m2. During the follow-up, 48 patients (82.7%) had a retrieval of their LVEF after a mean period of 6.4 months after trastuzumab termination. 10 cases of TIC were irreversible despite an optimal cardioprotective therapy.
Conclusion : Patients who develop toxic cardiomyopathy generally improve their LVEF on removal of the agent and after initiation of cardioprotective therapy. The clinical outcome is more favorable than anthracycline cardiotoxicity. This reversibility is usually observed in early identified patients, showing the importance of a systematic monitoring of LV function before, during and after the treatment.

Automatic coronary angiogram analysis algorithm: keyframe extraction phase

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Introduction: Coronary angiography is the gold standard for the diagnosis of coronary artery disease (CAD). Treatment decision is based on the severity of the disease and the obstruction percentage. This evaluation, often made by visual assessment done by clinicians during catheterization procedure, is the subject of high interobserver variability.
Objective: We aim to develop a fully automated coronary angiogram analysis method to have an accurate evaluation of CAD. To do so, keyframe extraction is the first and most important step.
Methods: The full dataset was collected from the exams performed by a single catheterization laboratory during the period between January 2018 and December 2021. We used a sample of angiograms for the keyframe extraction step. Each one was annotated by two experienced physicians using a web application. Each frame, being a set of pixels, undergo processing based on predefined filters. Filter pipelines have also been used to seek better performance. The frames were tested sometimes with and sometimes without cropping. The surviving pixel were used to calculate an intensity score. The frame with highest score and the six neighboring frames were chosen as keyframes. Each processing method was compared to the manually annotated frames. The processing methods are detailed in table 1.
Results: The full dataset consisted of 3159 angiographic study: a total of 37209 coronary angiogram was extracted. We used a sample of 45 angiogram to extract a total of 1434 frames. The manual annotation found 474 keyframe and 960 non-keyframe. By using the sato filter, we had an accuracy of 85.74%. The results of the other processing methods are resumed in table 1.
Conclusion: Keyframe extraction using image processing seems to be efficient and can be used for a fully automated coronary angiogram analysis

Transcatheter Aortic Valve Implantation: Initial Experience and One-Year Outcomes from a Single Institute in Tunisia.

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Background: Transcatheter aortic valve implantation (TAVI) is a novel method to treat selected high-risk patients with aortic stenosis. Implementation of this technique in developing countries is still very limited. This case series aims to report the results of a single center in Tunisia.
Methods: Nine consecutive patients with symptomatic severe aortic valve stenosis were planned for transfemoral TAVI using standard procedures between July 2016 and June 2021. Patients were further followed by retrospective record review up to one year to assess efficacy and safety according to the Valve Academic Research Consortium 3 endpoints.
Results: Patients had a mean age of 79 ± 5.6 years, two-thirds were women, and all had at least one major cardiovascular risk factor, except for a single case with stenotic degenerated prosthetic valve treated with valve-in-valve TAVI. Another case had a balloon aortic valvotomy for hemodynamic instability as a bridge to TAVI. The mean STS risk score was 7.80% ± 2.05. Eight patients out of nine were treated with self-expanding prosthetic valves while the remaining patient had a balloon-expandable prosthesis. Immediate procedural success was 77.8%. Procedural failure was due to severe aortic regurgitation and hemodynamic instability upon predilatation with subsequent death in one case, and valve embolization in the second case. At 30 days, device success and early safety endpoints reached 66.7% and 55.6% respectively, while clinical safety at one year dropped to 33.3%. Main adverse outcomes on follow-up comprised death due to intracranial hemorrhage and Pacemaker-lead infection, severe anemia, congestive heart failure and arrhythmia.
Conclusion: Our case series albeit small, provides insight to both caregivers and policymakers in Tunisia to further extend the scope of application of TAVI in patients with severe aortic stenosis at high surgical risk.

Three vessels coronary artery disease; A challenge to treat in Tunisian conditions

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Introduction: Three vessels coronary artery disease(CAD) is usually defined by the presence of angiographic stenosis of more than 50% in the three epicardial coronary trunks. Coronaries lesions are often complex and difficult to manage because of the need for specific devices and the frequent resort to surgery.
In this study we proceed to present epidemiological and clinical characteristics of patients with three vessels CAD and their medium-term evolution in single Tunisian cardiologic center.
Materials and Methods: This is a cross-sectional and descriptive study, conducted over a 12-month period from February 2019 to February 2020. It included all patients referred to the cardiac catheterization unit of the hospital of Gabes (Sather east of Tunisia) for coronary angiography.
Results: Among the 287 patients included, 19.5 %(n=56) of patients had three vessels lesions. The mean age was 64.61 years (47-79). Two-thirds (69.1%) were men. The indication for coronary angiography was NSTMI, STMI and Chronic coronary syndrome. Two thirds (64.3%) were diabetic, 53.6% hypertensive, 39.3% smokers, 23.2% dyslipidemic and 16.1% obese. One quarter (25%) of the patients had previous history of CAD. Coronary angiography showed a number of lesions ranging from 3 to 10 with an average of 5.48 lesions. The SYNTAX score was less than or equal to 22 in 66.1% of cases, between 23 and 32 in 26.8% of cases, and greater than or equal to 33 in 7.1% of cases. Medical treatment alone was indicated in 7.1% of patients, angioplasty was performed in 16.1% and coronary artery bypass grafting (CABG) was indicated in 76.8%.
After a 12-month follow-up of patients for whom CABG was indicated, only 20.9% of these patients were able to undergo bypass surgery. Of the remaining 42.9% refused surgery and 57.1% of cases are still on the waiting list. The one-year mortality rate was 10.7% and 14.3% were rehospitalized at least once in the same year.
Conclusion: Three vessels CAD is common in our population given the magnitude of cardiovascular risk factors. Anatomic lesions are more complex. Adequate management requires more specific means for both surgical and nonsurgical revascularization to improve the prognosis of these patients.

Epidemiological and etiological profile of Atrial Fibrillation: A Moroccan study

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Background: Atrial fibrillation is the most common supraventricular arrhythmia associated with significant morbi-mortality, which places a heavy burden on the health system. Unfortunately, not enough is known about the characteristics of African patients with AF. This study aimed to describe the epidemiological and etiological profile of atrial fibrillation in Moroccan patients.
Methods: This is a retrospective descriptive study in which we assembled, described, analyzed, and compared to international studies, data of 300 Moroccan adults with atrial fibrillation, who received care within Cheikh Khalifa international university hospital's cardiology department between January 1st, 2019, and January 1st, 2022.
Results: There was a male predominance with a sex ratio of 1.12. The mean age was 69±12,3 years with extremes ranging from 29 to 96 years. The majority (60,3%) were aged between 45 and 75 years. Common presentations were dyspnea (59.3%) palpitations (42.3%) and embolic complications (42%). Frequent risk factors were old age and hypertension and 90.78% of women, were postmenopausal. EKG abnormalities associated with AF were mostly left bundle branch block and repolarization disorders. Permanent AF was predominant. There were 53,4% of valvular causes, and the common lesion was mitral regurgitation. Ischemic cardiomyopathy was found in 22% of the patients and 4% of the patients developed AF on a healthy heart. Calculated CHA2DS2VASc was ^{3} 3 in 87,7% of the cases. Left ventricular ejection fraction was preserved in 54% of the cases, and 80.3% had left atrium enlargement. 21% of our patients had coronary artery disease with narrowing mostly found in the left anterior descending coronary artery and the right coronary artery. Laboratory tests revealed that 42% of the patients had chronic kidney disease. Thyroid dysfunction was noted in 9% of patients. In terms of stroke prevention, oral anticoagulants were mostly prescribed with a rate of 46.3%. A good outcome was noted in 93.4% of cases, however, 3.7% were transferred to the cardiac resuscitation unit and 2% died during hospitalization.
Conclusion: AF is correlated to several factors. Analyzing current findings provides a better understanding of our population making it easy to prevent, screen, diagnose and engage in suitable integrated management, then, therefore, improve health in individuals with this arrhythmia.

Assessment of glycated hemoglobin predictivity in the severity of coronary artery disease in patients with or without diabetes

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Background: Diabetes mellitus (DM) has been identified for several years as a major risk factor for coronary artery disease (CAD) which is currently the leading cause of death worldwide. Prolonged hyperglycemia can weaken the artery walls and promotes the formation and the rupture of atherosclerotic plaques. Glycated hemoglobin (HbA1c), expressed as a percentage, is a function of blood sugar control over the previous two to three months.
Generally, diabetes is controlled if the HbA1c level is less than or equal to 7%. Beyond that, the risk of developing long-term complications increases.
Objective: Access the relationships between the HbA1c level in the blood and the severity of CAD in patients with or without diabetes undergoing coronary artery catheterization in an urban teaching hospital.
Method: A cross-sectional study was conducted in the Cardiology Department of Gabes (Tunisia). Data were gathered from medical records of all patients who were recruited prior to cardiac catheterization for probable CAD between July (2021) and December (2021). The indications of cardiac catheterization were in accordance with international recommendations
Results: A total of 208 patients were included in the study. Mean age was 63.1±12.04 years. Of the total 64.9% (135) were males, 32.7% (68) were diabetic, 53.4% (111) were hypertensives, 40.4% (84) were smokers and 31.3% (65) were dyslipidemia. First, we tested the normality of distribution of SYNTAX score and HbA1c revealed negative concluding to using Spearman test to study the correlation between these two variable. We found that CAD severity by SYNTAX score as well as number of vessels involved was weakly related to level of HbA1c using Spearman Correlation test. Increase in HbA1c level was moderately correlated with disease severity and higher SYNTAX score (p-value =0.006) with a correlation coefficient equal to 0.206. A moderate increase was noted in the mean number of diseased vessels as HbA1c level increases. Gender Smoking, hypertension and dyslipidemia did not show significant difference, however Age, was found to be an independent predictor of severity of CAD by SYNTAX score (p =0.02).
Conclusions: From this clinical study, we can conclude that a moderate correlation exists between level of HbA1c and severity of CAD by SYNTAX score as well as number of vessels involved in diabetics and non-diabetics and HbA1c is a simply measured and reliable marker to predict the severity of CAD.

Instructions aux auteurs Revue Marocaine de Cardiologie

La revue marocaine de cardiologie, est l'organe de presse officiel de la société marocaine de cardiologie à but non lucratif, d'apparition trimestrielle, qui publie en langue française et anglaise des travaux scientifiques originaux.
La revue marocaine de cardiologie assure la création d'un espace de publication d'articles originaux, essai clinique méta-analyse de mises au point et de cas cliniques. Elle permet de communiquer les résultats d'études menées et d'assurer le développement de la recherche scientifique dans le domaine cardiovasculaire.
Les journées du congrès de la SMC bénéficient de numéros exclusifs.

Processus d'évaluation

Avant publication, Tout manuscrit reçu par la revue, doit être soumis à un comité de rédaction qui procède à une évaluation du texte, avec une relecture par des experts associée à d'éventuelles modifications, une vérification de l'originalité de l'article peut être exigée via l'outil de détection de plagiat.
En cas d'approbation, Les articles ne doivent pas être publiés antérieurement ni simultanément dans une autre revue, même électronique.

Déclaration éthique

Recherche comportant des expériences sur des humains ou des animaux ou des prélèvements de spécimens
Les recherches comportant des expériences sur les humains ou des animaux ou des prélèvements de spécimens doivent respecter les principes de la déclaration d'Helsinki « The Code of Ethics of the World Medical Association »:
- pour les expérimentations impliquant l'homme : https://www.wma.net/fr/policies-post/declaration-dhelsinki-de-lamm-principes-ethiques-applicables-a-la-recherche-medicale-impliquant-des-etres-humains/
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Les auteurs doivent obtenir toutes les autorisations de recherche nécessaires avant d'entreprendre les travaux sur le terrain, et les numéros de permis ou de licence de recherche doivent figurer dans le manuscrit.

Protection des patients participants aux études

Un consentement éclairé par écrit est nécessaire pour protéger le droit à la vie privée des patients. Toute information permettant d'identifier l'individu ne doit être publiée, à moins qu'elle ne soit essentielle à des fins scientifiques. Chaque individu qui apparaît en photographie, en vidéo, dans un enregistrement ou simplement nommément dans l'article, doit être préalablement informé.
Les auteurs doivent révéler à ces patientes toute information permettant potentiellement de les identifier qui pourrait être disponible sur Internet ainsi que dans la version imprimée après publication. Le consentement des patients doit être écrit et archivé par la revue et/ou les auteurs, conformément aux exigences des lois locales. Les auteurs sont priés de s'assurer d'être titulaires des droits sur les données en question, et d'archiver les consentements écrits des patients pour les fournir à l'éditeur à n'importe quel moment.

Conflits d'intérêts

Pour assurer la transparence et la crédibilité des articles publiés, la revue se refère aux normes internationales relatives aux conflits d'intérêt. Toute publication soumise doit comporter des documents à l'appui dévoilant les liens d'intérêt et les sources de soutien financier du travail.
Au cas où il n'existe aucun lien d'intérêts, ça doit être ajoutée directement en fin de manuscrit (avant les références bibliographiques)

Préparation et soumission du manuscrit

Principes généraux :
le texte des articles répond à la structure « IMRD » divisée en quatre sections : Introduction, Méthodes, Résultats et Discussion, Les formats de fichiers textes utilisables sont MS Word.
Les manuscrits sont à soumettre exclusivement sous format électroniques sur le site de la société marocaine de cardiologie à l'adresse suivant : smcmaroc.org
Page de titre :
La page de titre contient :
- le titre de l'article (titre en français et en anglais), avec éventuellement un sous-titre,
- Informations sur les auteurs : Nom et prénom et adresse e-mail dans l'ordre dans lequel ils apparaitront lors de la publication, les affiliations de chacun des auteurs, les départements ou institutions auxquels le travail est attribué, il faut préciser les coordonnées de l'auteur en charge de la publication
- Comptage des mots contenu dans le texte (sans tenir compte du résumé, illustrations références et remerciements).
- Nombre de figures et de tableaux.
- les remerciements éventuels.
- les sources de financements et les liens d'intérêts, s'il y a lieu.
Manuscrit :
La longueur maximale des textes (références comprises) doit être comme suit :
- articles originaux et mises au point : 12 pages ;
- cas cliniques: 4 pages ;
- arrêt sur image: 2 pages.
Les auteurs doivent veiller à ce que les textes soumis soient clairs et facilement compréhensibles, précis et concis.

Abréviations et symboles :
Seules les abréviations normalisées peuvent être utilisées en nombre limité. Éviter de les utiliser dans le titre du manuscrit. Les abréviations doivent être expliquées lors de leur première apparition dans le texte.
Les unités de mesure abrégées doivent être conformes aux nomenclatures internationales.
Figures et tableaux :
Les documents iconographiques (figures et tableaux) sont obligatoirement appelés dans le texte et conformes aux recommandations suivantes.
- Dans le manuscrit, les légendes des illustrations doivent être présentées sur une page séparée en utilisant les chiffres arabes correspondant aux illustrations (figure 1).
- Les tableaux sont numérotés en chiffres romains, par ordre d'apparition dans le texte : (tableau I).
- Les figures doivent être présentées chacune sur un feuillet séparé, et fournies en fichiers séparés à raison d'un fichier par figure ; elles sont toutes accompagnées d'une légende. Des explications ou notes diverses nécessaires à la compréhension figurent au-dessous de chaque tableau.
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Les auteurs doivent fournir les références bibliographiques directes des sources originales, rapportés à la fin de l'article et numérotées consécutivement dans l'ordre de leur première mention dans le texte. Identifier les références dans le texte, les tableaux et les légendes par des chiffres arabes entre crochets les références d'articles parus dans un périodique doivent comporter le nom des six premiers auteurs avec les initiales des prénoms (suivis de « et al. » à partir du 7ème auteur), le titre complet de l'article dans la langue originale, le nom de la revue selon les abréviations de l'Index Medicus, l'année, le numéro du tome, pages (première et dernière).

GUIDE OF AUTHORS

The moroccan journal of cardiology is the official press of the Moroccan Society of Cardiology. It appears quarterly and publishes original French and English scientific works.
The moroccan journal of cardiology ensures the publication of original articles, trials meta-analyses clinical reviews and case reports. It allows to communicate the results of studies and enhance the development of scientific research in the cardiovascular fields.

The submitted articles received by the journal must be peer-reviewed to ensure the high quality submissions with possible modifications. In order to verify the originality of submitted manuscripts the CrossCheck plagiarism detection tool can be used : https://www.elsevier.com/editors/perk/plagiarism-complaints/plagiarism-detection.
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Research involving human or animal experimentation or specimen collection must comply with principles of Helsinki Declaration « The Code Of Ethics of the World medical Association » :
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Written informed consent is required to protect the privacy rights of patients. Private informations should not be published unless for scientific purpose. Authors must inform individuals who appear in a photoraph, video, recording , simply by name, or about any information that may be available on the internet as well as in the print version. Patient consent must be archived by the journal or the authors, as required by the local law. Authors are requested to ensure that they own the rights to the data.

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A conflict of interest exists when professional judgment regarding a primary interest is likely to be influenced by a secondary interest (such as financial gain)
To ensure the credibitity of the published articles, the journal follows international standards for the conflicts of interest. All authors should declare any conflicts of interest related to the manuscript, these interests include commercial, personal, political and intellectual aspects. All the editors, editorial staff and reviewers should also report potential conflict of interest related to the submissions they are working with.
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The test of the articles on studies follows the structure « IMRD » divided into four sections : Introduction, Methods, Results and Discussion. The format of usable text files is MS World.
Manuscripts should be submitted excusively in electronic format on the website on the Moroccan Society of Cardiology at this address :smcmaroc.org

Title page :

The title page contains :
- The title of the article (in franch and in english), with a subtitle if necessary
- Author information: full name and e-mail adress in the order in which they appear in the publication, affiliations of each author, departments or institutions to which the work is attributed, contact information of the author in charge of the publication.
- Word count of the text (not including the abstract, illustrations references and acknowledgments)
- Number of figures and tables
- Acknowledgments
- Sources of funding and interests

Manuscript Sections :

The maximum length of the texts (including references) must be as follows :
- Original articles and developments : 12 pages
- Case reports : 4 pages
- Freeze frame : 2 pages.

The submitted text should be clear and easily understandable, Precise and concise. The languae should be simple and correct. Abbreviations should be explained when they first appear in the text and then used consistently and invariably.

Abbraviations and symbols :
Only a limited number of standard abbreviations may be used. Avoid using them in the title of the manuscripts. Abbraviations must be explained when they first appears in the text. Units of measurement must conform to the international nomenclatures.

Figures and tables :
Iconographic documents (fugures and tables) must be called up in the text and conform to the following recommendations :
- Captions for illustrations should be presented on a separate page using the arabic numerals corresponding to the illustrations (Figure 1)
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- If a figure has already been published, acknowledge the original source and submit written permission from the copyright holder to reproduce the figure.
- Abbreviations should be avoided. If the figure or table contains abbreviations, they must be explained in the legend.
- Drus should be listed by their international non proprietary names (INN). Trade names should be iven in brackets after the INN. Symbols, figures and text in figures should be clear and of sufficient size to ensure that each element is perfectly legible. The publication of illustration in color is recommended.

References :
Authors should provide direct bibliographic references to original sources, reported at the end of the article and numbered consecutively in the order of their first mention in the text. Identify references in the text, tables and legends by Arabic numbers in square brackets.
References to articles in a journal must include the named of the first six authors with first name initials (followed by « and al. » from the 7th author), the full title of the article in the original language, the name of the journal according to the Index Medicus abbreviations, the year, the volume number, pages (first and last).


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