Archives of the Balkan Medical Union
vol. 52, no. 3, pp. 245-248
September 2017

ORIGINAL PAPER

RECENT MYOCARDIAL INFARCTION AND FEMORAL NECK FRACTURE SURGERY – A SINGLE CENTER RETROSPECTIVE STUDY

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Abstract

Introduction. The management of patients with an acute fracture of the femoral neck who suffered an acute myocardial infarction during the previous 3 months before surgery is still a challenge.
Objectives. By studying the relationship between preoperative cardiovascular evaluation and post-operative morbidity and mortality of these patients, the time to surgery may be shortened and we can guide the option of operative vs non-operative treatment by better decision making on when to operate and wheather to operate these patients.
Methods. The study included 28 patients with femoral neck fracture that underwent surgery between 2011-2016, with a documented acute myocardial infarction during the 3 months prior to surgery. The end-point of the follow-up was 60 day postoperatively. Main outcome measure was death after surgery, up to 60 days postoperatively. Preoperative evaluation included standard evaluation and cardiovascular evaluation – revised cardiac risk index evaluation, electrocardiogram, echocardiography for left ventricular dysfunction, Duke Activity Status Index (DASI) questionnaire, troponin I, NT pro BNP and high sensitivity CRP values.

Résumé

L'infarctus du myocarde récent et la fracture du col fémoral traitée par chirurgie – une étude rétrospective d'un seul centre

Introduction. La prise en charge des patients atteints d'une fracture aiguë du col fémoral, ayant subi un infarctus aigu du myocarde au cours des 3 mois précédents, est très difficile et la chirurgie reste un défi. En étudiant la relation entre l'évaluation cardio-vasculaire préopératoire et la morbidité et la mortalité post-opératoires de ces patients, nous pourrons éventuellement réduire le temps de la chirurgie et nous pourrons guider l'option de traitement opératoire vs non opératoire par une meilleure prise de décision sur quand nous opérons et si on opére ou non sur ces patients spécifiques.
Méthodes. Dans cette étude ont été inclus 28 patients avec fracture du col fémoral,traités chirurgicalement entre 2011-2016, qui avait un infarctus aigu du myocarde documenté dans les 3 mois avant la chirurgie. Le point final du suivi était de 60 jours postopératoires. La mesure principale du résultat était la mort après la chirurgie à 60 jours postopératoires. L'évaluation préopératoire a inclus l'évaluation standard et l'évaluation cardiovasculaire – l'évaluation

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Results. Ten patients died at the 60 days follow-up (35.7%), five deaths being due to cardiovascular complications. One patient from the survivors had an acute myocardial re-infarction, 10 days after surgery, and one patient has been hospitalized for acute onset of arrhythmia. All twelve patients had troponin I levels greater than 0.10 µg/L, a NT-proBNP level greater than 800 pg/mL and high sensitivity CRP greater than 1.57 mg/L, showing an increased preoperative risk of cardiovascular events. The Duke activity index for the ten patients was higher than 4 but less than 6 METS.
Conclusions. The femoral neck fracture in a patient with recent myocardial infarction involves a difficult decision and a multidisciplinary collaboration. Although rare, this combined pathology is difficult to manage and still has no consensus on when to wait, how long to wait until surgery and whether to operate or to treat functionally these particular patients.
Our conclusion is that we have to make a fast preoperative evaluation of these patients and decide for each patient individually, balancing the risks of non-operative treatment and operative treatment.

Key words: femoral neck fracture, myocardial infarction, preoperative evaluation.

Résultats. Dix patients sont décédés à un suivi de 60 jours (35,7%) dont cinq proviennent de complications cardiovasculaires. Un patient des survivants a eu un ré-infarctus aigu du myocarde, 10 jours après la chirurgie et un a été hospitalisé pour le début aigu de l'arythmie. Tous les 12 patients présentaient des taux de troponine I supérieurs à 0,10 µg / l, des taux de NTproBNP supérieurs à 800 pg/mL et une PCR à haute sensibilité supérieure à 1,57 mg/L, ce qui montrait un risque préopératoire accru d'événements cardiovasculaires. L'indice d'activité de Duke pour les dix patients était supérieur à quatre mais inférieur à six METS.
Conclusions. Nous voulons mettre en évidence cette situation compliquée qui implique une prise de décision difficile et une collaboration multidisciplinaire, c'est-à-dire la fracture de la hanche aux patients avec un infarctus du myocarde récent. Bien que rare, cette circonstance est difficile à gérer et n'a toujours pas de consensus sur le moment d'attente, combien de temps attendre jusqu'à la chirurgie et si l'on doit opérer ou traiter fonctionnellement ces patients en particulier.
Notre conclusion est que nous devons faire une évaluation préopératoire rapide de ces patients et décider pour chaque patient individuellement et équilibrer les risques de traitement non opératoire et de traitement opératoire.

Mots-clés: infarctus du myocarde, fracture de la hanche, evaluation préopératoire.

Introduction

A recent myocardial infarction is considered less than 3 months before current hospital presentation. A surgical intervention is associated with an increased risk for a new acute coronary event. Therefore, it is preferable to postpone surgery at least six months after the myocardial infarction in chronic orthopedic surgical patients.

Femoral neck fractures are considered orthopedic emergencies, due to the risk of medical complications in geriatric patients. In these patients, functional treatment is not a good option because of the nursing problems.[1]

Femoral neck fracture in elderly (over 65 y.o.) is an increasing traumatic event that requires emergency surgery. The treatment method of choice is mainly hemiarthroplasty of the hip (bipolar cemented or uncemented prosthesis, Thompson-Moore cemented or uncemented cephalic prosthesis), but may also be a total arthroplasty or an osteosynthesis with screws or dynamic hip screw. Regardless of the specific desired surgical technique, the cardiovascular risk of this type of surgery is medium, because of the age at which hip fractures occur, the comorbidities of the elderly, the blood loss during the intervention, and the mandatory need for surgery of this pathology.[2]

A risk index has been proposed for the stratification of the cardiovascular risk prior to surgery. The first risk index was imagined and proposed by Goldman and collab. in 1977. Since then, multiple adaptations by Lee and collab and Eagle and collab were made after the initial model. The Revised Cardiac Risk Index (RCRI) is now the tool used to predict cardiovascular complications in the preoperative evaluation. It includes six variables.[3] It classifies

hip surgery-specific risk as moderate, and accounts the risk of cardiovascular events and death between 0.4% (for no risk factors) and 5.4% (for three or more risk factors). A recent myocardial infarction during the 3 months prior to surgery will increase the risk of a new cardiovascular event or cardiovascular death. In large trials, it has been reported that in-hospital mortality after myocardial infarction in the patient population over 75 years old is between 19-26%.[4]

The Duke Activity Status Index (DASI) is a self-administered questionnaire that has been validated previously in a variety of cardiac disease populations, to evaluate functional status. The DASI consists of 12 items and each item has four response options, ranging from 1 = "can perform the activity with difficulty" to 4 = "cannot perform the activity at all". The activities in the DASI include personal care, ambulation, household tasks, sexual function and recreational activities, which represent major aspects of physical function. The total score can range from 0 to 58.2, with higher scores indicating better functional status. The score is then used to calculate METS – metabolic equivalents.[5]

High values of NT-proBNP, high sensitivity CRP, and troponin I are all associated with high risk of cardiovascular complications in the postoperative period.

Objectives

The objective of our study was to evaluate if combining the preoperative cardiovascular and functional status evaluation and the dosage of cardiovascular biomarkers could predict the risk of further cardiovascular complications for this specific association of comorbidities in elderly patients.

Methods

The study retrospective included all patients with hip fracture that underwent surgery between 2011-2016 in the University Emergency Hospital of Bucharest, Romania. Some of these patients had documented acute myocardial infarction during the 3 months prior to surgery. The end-point of the follow-up was 60 day postoperatively. Main outcome measure was death after surgery to 60 days postoperatively.

Between 2011-2016, in the University Emergency Hospital of Bucharest were admitted 1134 patients with the diagnosis of femoral neck fracture. In this patient population, 841 patients were older than 75-year-old (74% of the patients). The sex distribution was: 796 women (70.19%) and 338 men (29.80%).

We have found 42 patients with documented myocardial infarction before the moment of hospital presentation for hip fracture. There were 5 patients that had an acute coronary syndrome between the moment of presentation and surgery for femoral neck fracture. 14 patients were treated non-operatively, due to high risk and associated comorbidities, including the concomitant myocardial infarction.

After exclusion of nonoperatively-treated patients from the follow-up, there were 28 patients left in the study. Medium time from presentation to surgery was 9.5 days (3-16).

All patients have been examined by a cardiology specialist prior to surgery. Electrocardiogram and echocardiography were performed in each patient. Troponin I, NTproBNP and high sensitivity CRP were obtained, as well as routine blood analysis. The RCRI (revised cardiac risk index) was applied to stratify the need for preoperative intervention on risk factors. Severe anemia, blood sugar, and increased creatinine were corrected by transfusion, respectively insulin or oral antidiabetics/insulin and intravenous perfusion of fluids prior to surgery. The specific beta-blocker therapy (metoprolol or bisoprolol) was either started or administered as the prior prescription.

All patients were anticoagulated in a curative manner by low molecular weight heparin, administered subcutaneously once every 12 hours as protocol. The oral antiaggregant and anticoagulant therapy was discontinued on admission.

All patients were evaluated by a senior anesthesiologist, orthopedic surgeon, and cardiologist. The patients and their families have been informed about the specific risks and benefits of surgery and their current cardiac pathology. Patients were advised to accept surgery, unless life expectancy was low. Signed informed consent was obtained from each patient or his family.

All patients in this study have been treated by an uncemented Austin-Moore hemiarthroplasty. 17 patients received general anesthesia and 11 patients received spinal anesthesia. The vital functions were noninvasively monitored during surgery. The antibiotic prophylaxis was done with 1,5 g of cefuroxime perioperatively and repeated during the first 24 hours after surgery.

A drainage tube was left for 24 hours, in order to monitor bleeding. Only 3 patients needed a blood transfusion 48 hours after surgery, for a hemoglobin drop to 7 mg/dL. Beta blockade therapy was restarted after surgery in the Postoperative Care Unit, during the day of surgery. All patients were moved to the orthopedic ward the day after surgery.

Follow-up consisted in completing a phone questionnaire, by the contact person recorded on

the hospital admission. The follow-up recorded if the patient was deceased or not, the re-admission in hospital after discharge, the pathology for which he was readmitted to the hospital, and the functional status after surgery, as in Duke Activity Index questionnaire.[5-9]

Results

The total number of patients with documented recent myocardial infarction and acute hip fracture in our unit was 42 over a period of 5 years. A number of 5 patients had an acute coronary syndrome after the admission in the orthopedic unit, prior to surgery.

The 60-day follow-up for patients with recent myocardial infarction (less than 3 months) was done for 28 patients. For the other 14 patients with recent myocardial infarction, the non-operative treatment was preferred, due to the high risk of surgery or because of the personal or family decision.

Ten patients died at the 60-day follow-up (35.7%), five from cardiovascular complications. Four patients died before discharge. One patient from the survivors had an acute myocardial re-infarction, 10 days after surgery, and one has been hospitalized for an acute onset of arrhythmia. All twelve patients had troponin I level greater than 0.10 µg/L, a NT-proBNP level greater than 800 pg/mL and high sensitivity CRP greater than 1.50 mg/L. The functional outcome for the survivors with the Duke Activity Index varied between 4 and 6 METS.

Conclusions

The mortality in this distinct group of patients is still high all over the world. The most difficult question is whether to operate or not the hip fractures during the 3 months after a myocardial infarction. We did not have a control group, to observe the patients who have been treated functionally, and to compare morbidity and mortality with the group of patients that have been operated. It may be difficult to have a control group, because frequently patients who are not operated have cardiac morbidity and low functional status, associated with a poor prognosis even in the absence of surgery. Therefore, a randomized control trial, with strict criteria for inclusion and exclusion, may be beneficial.

By our retrospective study, we concluded that every patient with this complex association of pathology must be evaluated individually and the therapeutical decision should be based on distinct findings of the preoperative evaluation.

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