Atrial Fibrillation in Patients Undergoing Hip Fracture Surgery

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Conflict-of-interest statement: The author(s) declare(s) that there is no conflict of interest regarding the publication of this paper.

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Received: May 28, 2018 Revised: July 30, 2018 Accepted: August 1 2018 Published online: February 2, 2019

ABSTRACT

More than 90% of hip fracture patients are older than 70 years and in most studies mean age is close to 85 years. Increasing age is also associated with a higher prevalence of atrial fibrillation (AF). In present review we will try to answer 3 main questions about the effect of atrial fibrillation in patients with hip fracture: (a) Is there a relationship between AF and risk of hip fracture? (b) Which should be perioperative management of anticoagulant treatment? (c) Has AF a long term prognostic value on survival after hip fracture surgery and is there a relationship between AF and the results of rehabilitative treatment? Moreover we evaluated the few reports about incidence and prognostic value of new onset postoperative atrial fibrillation.

Key words: Atrial fibrillation; Hip fracture; Anticoagulant treatment; Prognosis

INTRODUCTION

Fragility fractures are responsible for 300,000 annual UK emergency department attendances and over 9 million annual fractures worldwide[1,2]. In Italy every year approximately 90,000 patients undergo surgery for hip fracture[3]. More than 90% of hip fracture patients are older than 70 years and in most studies mean age is close to 85 years[4,5]. Increasing age is associated with a higher prevalence of atrial fibrillation (AF)[6]. Between 12 and 14% of patients admitted to our institution for hip fracture were in atrial fibrillation before surgery. Moreover patients in sinus rhythm at admission, due to age and comorbidities, are at an increased risk of developing postoperative atrial fibrillation (POAF)[7]. Aim of this review was to evaluate the effects of both preexistent and postoperative atrial fibrillation in patients undergoing hip fracture surgery.

PREEXISTING ATRIAL FIBRILLATION

The incidence of atrial fibrillation at admission in patients referred to hospital for hip fracture has been reported between 7 and 10%[8,9] but is probably underestimated. In a case control study including 888 patients (444 cases), after correction for potential confounders, atrial fibrillation was the more frequent ECG abnormality associated with hip fractures (OR 2.7; 95% CI 1.2-6.1)[10].

In present review we will try to answer 3 main questions about the effect of preexisting atrial fibrillation and hip fracture: (a) Is there a relationship between AF and risk of hip fracture? (b) Which should be perioperative management of anticoagulant treatment? (c) Has AF a long term prognostic value on survival after hip fracture surgery and is there a relationship between AF and the results of rehabilitative treatment?

According to the first question a number of cardiovascular diseases have been related to an increased risk of osteoporotic fracture. At present limited information is available in literature about the relation between atrial fibrillation (AF) and subsequent fragility fracture risk.
In the study by Wong et al[13] clinical and hospitalization information of 113,600 individuals were linked over a 14-year period. Annualized incidence of hip fracture was 17.5 per 1000 person-years (95% CI 16.8-18.1) in those with AF in comparison to 7.4 per 1000 person-years (95% CI 7.1-7.7) in those without AF. Unadjusted risk ratio for patients with AF was 2.39 (95% CI 1.96-2.91) in men and 2.91 (95% CI 2.55-3.34) in women. After adjusting for potential confounders, these associations were attenuated but remained statistically significant. Conversely an association of incident AF with the risk of subsequent falls or hip or other fractures was not shown in the Cardiovascular Health Study (CHS) cohort[13]. Individuals with AF were not found to have a higher risk of hip fracture (adjusted HR = 1.09, 95 % CI 0.83-1.42) or fracture at any selected site (adjusted HR = 0.97, 95 % CI 0.77-1.22) compared with those without AF.

Although at present data are contrasting, patients with a history of AF may represent a clinical population in whom screening for and treatment of osteoporosis may be warranted to reduce the risk of subsequent fracture.

Perioperative management of anticoagulant treatment is a relevant factor in fragility fractures patients At least 20% of patients with hip fracture are on ongoing anticoagulant (both warfarin and direct oral anticoagulants) at the moment of hospitalization. Since hip fracture treatment is a close time-dependent surgery, restoration of coagulative activity is usually a primary need for anesthesiologists and surgeons. Bridge therapy with LMWH at anticoagulant dose may be considered for high risk patients (mechanical valve in mitral position, previous stroke or TIA, recent venous thromboembolism) but the matter is still debated and recent data suggested an increased risk of postoperative bleeding in patients treated with “full doses” of LMWH[20]. LMWH at dosage used for DVT prophylaxis is safe in most patients without an increased risk of thromboembolism and with a lower risk of hemorrhagic complications.

Another problem in high risk patients may be the safety of rapid correction of anticoagulation with vitamin K administration. At present few data have published about the balance between an increased risk of embolism and the advantage of early hip surgery. Moores et al[21] reported that a low intravenous dose of vitamin K (mean of 2.2 -range, 0-4- administrations of 2 mg of vitamin K) allowed to decrease mean INR from 2.6 (range, 1.1-4.6) to < 1.7 within 18 hours (mean, 14 hours). 78% of patients underwent surgery within 36 hours in 46 low risk patients in warfarin therapy. The 3 high-risk patients (prosthetic heart valve) underwent bridging therapy with low-molecular-weight heparin and received no vitamin K; their mean INR on admission was 3.2 (range, 3.1-3.3) and the mean time to surgery was 5.3 (range, 3-8) days. Two low-risk patients and one high-risk patient died within 5 days of surgery. Overall 30-day and one-year mortality were 8.2% and 32.6%, respectively.

Data from our Institution suggest that vitamin K administered per os (10 mg eventually repeated after 24 hours) is associated with a lower time to surgery and a trend to lower in hospital mortality. Moreover patients not treated with vitamin K had a higher incidence of POAF (17.8% vs. 11.1%) and a lower time to surgery and a trend to lower in hospital mortality. Nevertheless we did not find significant difference in survival at 1 year follow-up between patients with or without atrial fibrillation at the moment of surgery.

POST-OPERATIVE ATRIAL Fibrillation

Until recently post-operative atrial fibrillation (POAF) after non cardiac surgery it was considered a self-limited entity with a quite favorable long-term prognosis. However knowledge of POAF largely relies on retrospective studies and analysis of administrative datasets. Moreover at present there are no high quality prospective studies to direct clinical management of these patients. An increased sympathetic tone, related to pain, anemia, hypoxia, hypoglycemia, hyperthyroidism, changes in volume status and hypotension, or to surgery itself, is considered the main trigger for POAF[20]. Administration of perioperative catecholamine may sometimes favor POAF. Changes in cellular resting potentials, automaticity, and excitability due to electrolyte abnormalities, in particular hypokalemia, is also associated with an increased risk of POAF[21]. Myocardial ischemia may contribute to POAF in hip fracture surgery. Recently high sensitive troponin I ≥ 6.5 ng/L was were reported to be associated with a 5 fold risk increase of POAF (17.8 vs 3.2%)[22].
The incidence of POAF in non-cardiothoracic surgery is lower than in cardiothoracic surgery and ranges from 12%-19% for abdominal surgery to 4.8% after total joint replacements[23-26]. After NCTS, patients usually return in a general ward without continuous cardiac monitoring. Diagnosis is made usually at symptoms onset or eventually during clinical reevaluation. Therefore exact timing of onset of POAF is unclear and asymptomatic episodes may never be detected. No clear indication exists about treatment of arrhythmia, amiodarone being the most used drug, nor about the need for subsequent anticoagulation. POAF in non-cardiothoracic surgery is associated with significant morbidity and mortality and an increase in resource utilization, length of stay, rehospitalization and finally with an increased risk of stroke. Since long-term follow-up data are limited and AF may recur, these patients should receive careful reassessment and follow-up. In patients who recover rapidly sinus rhythm careful monitoring it is difficult to justify long-term anticoagulation unless recurrent episodes of AF are documented.

Limited data address the significance of perioperative atrial fibrillation (AF) and its subsequent treatment in emergent orthopedic surgery in the elderly. Leibowitz et al[19] retrospectively studied the outcome of newly diagnosed AF among patients initially in sinus rhythm undergoing hip fracture repair. In 410 subjects over the age of 65 who underwent repair of hip fracture 15 (3.7%) developed AF during hospitalization. Only a previous history of AF and current use of beta blockers were predictive of the development of AF following hip surgery. Mortality among patients with new onset AF was significantly higher than in patients without AF (60% vs 19.5%; p < 0.001). Chronic treatment with anti-arrhythmic therapy as well as treatment with anticoagulation was also associated with one-year mortality. On multivariable analysis, AF during hospitalization was the variable most significantly associated with mortality (hazard ratio 6.7 95% CI 2.1-21.4). Between February 2012 and July 2016 3129 patients were referred to trauma Center of AOU Careggi (Florence). Two hundred and seventy seven were in permanent atrial fibrillation at hospital admission and were excluded from the study. Overall 104 patients (mean age 84 years, females 73%) developed a POAF (3.4%). Average time of onset after surgery was 2 days. Eight patients died during hospitalization. 81.7% were discharged in sinus rhythm. POAF group in comparison to control group (e.g patients in stable sinus rhythm) had a longer time to surgery (2.4 ± 1.6 days vs 3.8 ± 3.3 days) and length in hospital stay (14.4 ± 5.1 days vs 19.7 ± 10.4 days). Furthermore 1-year mortality was significantly higher in POAF group in comparison to control group (39.3% vs 20.9%, p < 0.001).

At present we have no clearly demonstrated risk factors for POAF. An history of paroxysmal AF, the presence of at least moderate mitral regurgitation and increased preoperative high sensitive troponin I may be related with an higher probability of developing POAF. As well there are no suggested treatment strategies both for rhythm recovery and for long term anticoagulation. The growing collaboration between orthopedics and clinicians may help to find an answer.

REFERENCES


