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Case Report

Fatal Abdominal Migration of the Helical Blade during Per-Tochanterian Fracture

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Abstract

Proximal femoral fracture in elderly subjects is a major event that is life-threatening in the medium-to- long term. Advanced age, male gender and number of comorbidities largely account for high mortality and require geriatric expertise. Protein-energy malnutrition and bone demineralization increase mortality. Mortality can, on the other hand, be reduced by acting on two variables accessible to medical intervention: daily activities and nutritional status. Functional and neurocognitive assessment allow the risk of dependency to be evaluated, and global geriatric work-up can prevent sudden breakdown of homeostasis. In the emergency setting, pain is to be alleviated, polymedication and anticoagulation therapy checked, and instability (notably cardiac and pulmonary) and confusion syndrome screened for on geriatric and anesthesiologic opinions. Surgery should be implemented without delay, within 48hours of admission, preferably using multimodal anesthesia.

The paradoxical migration of the helical blade to the abdominal cavity is a poorly understood phenomenon that is increasingly observed in the management of pertrochanteric hip fractures with the intramedullary nail.

The objective of this study was to study the clinical course and possible complications of this incident.

Keywords: Pertochanter; Abdominal migration; Helicat blade; Elderly

Background

Proximal femoral nails with a helical blade are a new generation of implants used for treating transtrochanteric fractures. The blade design provides rotational and angular stability for the fracture. Despite greater biomechanical resistance, they sometimes present complications. In the literature, there are some reports of cases of perforation caused by helical blades. Here, a clinical case of abdominal migration of the helical blade through the femoral head into the abdominal Cavity is presented.

Case Report

90-year-old patient, Risk factors; hypertension for 4 years on Amlodipine 5mg, and ARA2 5mg, no diabetes, postmenopausal, age, osteoporosis.

ATCDs; ETT in 2015 objectivizing hypertrophic cardiomyopathy with an alteration of the diastolic ventricular function. Plus a thickening of both mitro-aortic valves of degenerative origin with minimal mitral insufficiency.

Ejection fraction at 69%.

Clinically the patient presents with stage 2 dyspnea, no chest pain, no syncope, no palpitations. Neurologically;

conscious, GCS 15/15, BP, 120/65 mmhg. FC, 74 B/M, apyretic.

She presents with a right per-trochanteric fracture following a fall from her height.

She was operated on; the intraoperative procedure was performed with bleeding of 200 ml, and hemodynamic instability requiring drugs, namely norepinephrine + adrenaline + a possible transfusion of a Globular Cap following abdominal migration of the helical blade.

Immediate postoperative patient sent to Radiology for a thoracoabdominal CT scan, which was found to be normal, Normal venous ultrasound, flach and RTT; normal, no sign of pulmonary embolism,then admitted to intensive care for further treatment.

With a biologic workup shows:

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HB; 8.1 g/L / TP; 42% INR; 1.91

PLQ; 323000 / Uree; 1.03, Creat; 17.3

GB; 30700 / CRP; 78.42

The initial evolution was marked by the withdrawal of adrenaline with a few rough awakenings and the start of antithrombotic treatment (LMWH).

Hence withdrawal from intubation plus nebulization of adrenaline and before the onset of hemodynal instability with a BP; 70/30mmhg AND tachycardia at 130 B/M.

The patient was re-intubated and put on norepinephrine with the appearance of a distended abdomen and a dullness to the percussion.

A check-up was requested

HB; 6.6 G /L / TP; 44% INR; 1, 83

PLQ; 203000 / Urée; 1, 30, Créat; 19, 9

GB; 30700 / CRP; 126 / K+: 5.9

Hence the installation of an oliguria; 0.3 CC/KG/H with degradation of the renal function.

Finally, the evolution was marked by the persistence of instability with vasovagal syncope (bradycardia + asystole) or cardio-respiratory arrest despite all resuscitation measures.

Discussion

Pertrochanteric fractures, defined as the extracapsular region extending from the basicervical level of the femoral neck to the level of the lesser trochanter just above the medullary canal, account for 50% of these fractures [1]. Fixation failure is seen in 5% of these pertrochanteric fractures and is associated with doubling of healthcare costs, a two-fold increase in the length of hospital stay, reduction in quality of life, and an increased likelihood in subsequent social dependency [2]. With hip fractures becoming more common and complex in the ageing population, the economic and clinical strains on healthcare systems are expected to increase [3].

The present case showed that the helical blade had migrated medially into cavity abdominal. However in A review of literature reveals six different papers; two of them by Brunner et al. [4] and Simmermacher et al. [5] respectively, who attributed the perforation of the femoral head to recent trauma.

Wanjun Li et al. [6] conducted a retrospective analysis of 233 patients and observed that 3.6% of the patients had medial migration of the blade without loss of reduction. Similar mechanism of failure of implant was termed as “cut through” by Frei et al. [7] in seven patients and the cause was attributed to the failure of the lateralization of the blade.

Takigami et al. [8] and Gomes et al. [9] also reported medial migration of the blade causing acetabular perforation but did not comment about any specific cause for the same. Imperfect blade locking has been described with back out of the helical blade [10] but none with medial migration of the blade. To the best of our knowledge, this is the first case reporting loosening of locking mechanism with a medial migration of the blade as a cause for femoral head perforation. In our opinion the loosening of the blade occurred due to cyclical loading destroying the threads of the locking bolt in the postoperative period, although failure to slide the blade laterally could also have been an additional contributing factor. Further studies are required to investigate the risk factors and understand the patho-mechanism for femoral head perforation.

During the peroperatory, our patient presented a hemodynamic instability consisting of bleeding with hypotension and tachycardia, just after the migration of the helical blade. However, the complication presented in this report is not a conventional case of cut-out, but a new phenomenon of implant failure that we cannot described as cut-through by Frei et al. [7] and previously reported by Simmermacher et al. [5] and Brunner et al. [4] a perforation of the femoral head by the blade insertion axis, without significant loss of reduction. The case described, a perforation with abdominal migration, could have presented more serious complications with vascular injury and a different outcome.

Osteoporosis influences the cut-out event. Bonnaire et al. [11] have shown that bone mineral density of less than 0.6 g/cm^3 increases the risk of implant failure.

In front of the persistence of the hemodynamic instability in post operation, a chain of complementary examinations with thoraco-abdomino-pelvic Scanner, an echocardiography flach, followed by a venous echography; in order to objectivize the etiology of this hemodynamic aggravation whose evolution was fatal by a vasovagal syncope (bradycardia, asystole) then a cardio respiratory arrest.

Conclusion

Per trochanteric fractures of the femur is a model of the essential issues in geriatric traumatology that can be extrapolated to traumatology and orthopedics for the elderly in general.

Fatal abdominal migration after post fixation with Proximal Femoral Nail Antirotation-II for unstable per-trochanteric fracture is as such an uncommon complication. Loosening of the blade is an unreported cause for the same and should be considered in such cases.

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