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Succession of failures in surgical management of fragility fracture of the pelvis

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ABSTRACT

Case: We report a case of a 79-years old man who sustained a Fragility Fracture of the Pelvis (FFP) classified type IVb according to Rommens and Hofmann. After a delayed diagnosis with persistence of pain and loss of mobility, a bilateral sacroplasty was performed. Although pain relief was achieved, a fracture progression (FP) occurred with bilateral neurologic compression of L5 and S1 nerve roots with pain recurrence. A percutaneous ilio-lumbar reduction was attempted with cemented augmentation and bilateral ilio-sacral screwing. Reduction was not achieved and screws finally pulled-out. The patient died one year after institutionalization with a significant loss of mobility and autonomy.

Conclusions: Misunderstanding in management of FFP according to Rommens and Hofmann recommendations can lead to bad results with fracture progression, implants failure, pain recurrence, loss of function, loss of autonomy and finally death of the patient.

Introduction

The increasing life expectancy is associated with a growing incidence of Fragility Fractures of the 2nd half of the Pelvis (FFP) [1]. A few studies have shown that FFP was a prognostic factor for higher mortality rate, loss of independence and institutionalization [2]. Surgical treatment is associated with good functional outcomes and decrease of mortality rate [3]. However, such results are expected only if surgical management is well adapted according to the Rommens and Hofmann recommendations [4,5].

We present a case of FFP type IVb according to Rommens and Hofmann with a succession of failures in the management, in the choice of surgical technique, leading to pain recurrence, loss of function and mobility until the patient died. To our knowledge, case reports on FFP that have been published are only “happy-ending” cases. Unfortunately, misunderstanding and lack of knowledge in surgical management of FFP are not rare and doctors/surgeons should be aware of consequences of such mistakes.

Case report

A 79-year-old man presented in the emergency room with debilitating pain in the lumbar spine and hips. He had a medical history of Parkinson's disease and repeated falls from height complicated with lumbar osteoporotic vertebral compression fractures. Before admission, patient lived at home and was independent. He was used to walk with a crutch or cane outside only, with a Parker Mobility

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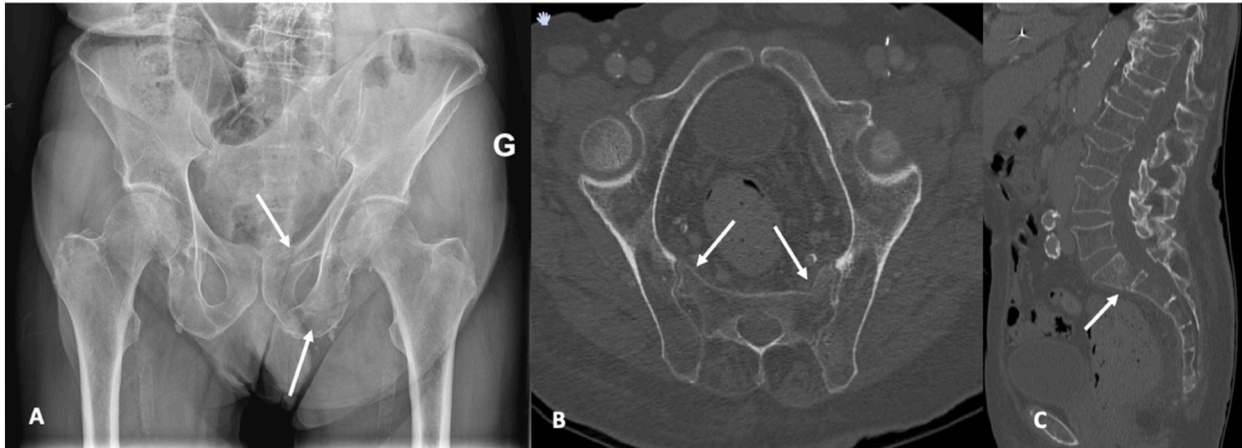


Fig. 1. A Anteroposterior pelvic radiograph showing a slightly displaced pubic ramus fractures on the left side (white arrows). B Oblique CT reconstruction in the plane of the pelvic brim showing a bilateral vertical fractures through the sacral ala (white arrows). C Midsagittal view of pelvic CT-scan showing a non-displaced fracture at the anterior sacral cortex between S1 and S2. Due to the bilateral sacral ala fractures (see Fig. 1B) and the horizontal fracture component between them at the transition of S1 to S2 (see panel C), there is a non-displaced spinopelvic dissociation (H-type sacral fracture).

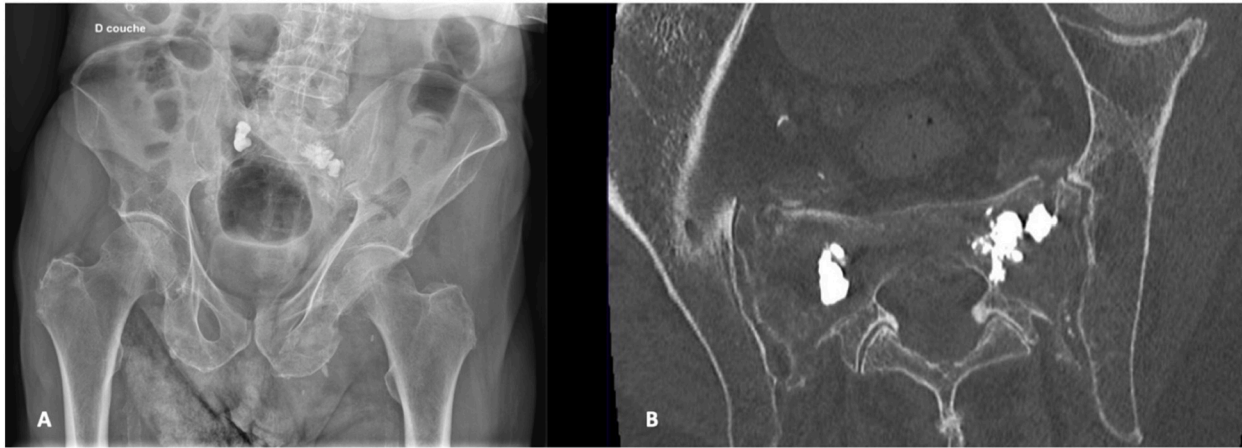


Fig. 2. A Anteroposterior pelvic radiograph showing bilateral sacroplasty. B Oblique CT reconstruction in the plane of the pelvic brim showing a cement distribution without leakage.

Score evaluated at 8/9 [6]. An anteroposterior pelvic radiograph was performed and showed slightly displaced superior and inferior pubic ramus fractures on the left side. A CT-scan was not deemed necessary. No posterior injuries were diagnosed, therefore the lesion was classified as FFP1; and the patient was admitted in a geriatric unit for rehabilitation (Fig. 1A). Due to persistence of pain, a pelvic CT-scan was performed several days after admission, showing a spinopelvic dissociation with bilateral vertical fractures through the sacral ala with a horizontal component in between (H-type sacral fracture, Fig. 1B and C). The fracture was now classified as FFP type IVb according to the Rommens and Hofmann classification [4,5]. A bilateral sacroplasty was performed with high-viscosity PMMA cement Vertaplex HV (Stryker, Kalamazoo MI, USA) and pain relief was achieved (Fig. 2). Immediate full weight-bearing was permitted. Two weeks after surgery, pain recurred on lumbar spine and on the hips. Neuropathic pain appeared on both L5 and S1 nerve roots. A pelvic CT-scan showed Fracture Progression (FP) with a sagittal displacement of the H-type fracture (Fig. 3). A percutaneous ilio-lumbar reduction was attempted with cemented augmentation using the Longitude 2 system (Medtronic, Minneapolis, MN, USA) and bilateral ilio-sacral screwing using 7.3 cannulated titanium screws (Depuy Synthes, Switzerland). Reduction was not achieved and screws finally pulled-out very shortly after the procedure (Fig. 4). At last follow-up of one year, Parker score was 3/9 and patient needed institutionalization in a nursing home. Finally, the patient died one year after institutionalization with a significant loss of mobility, autonomy.



Fig. 3. Midsagittal view of pelvic CT-scan showing (white arrow) a fracture progression with displacement of the horizontal fracture between S1 and S2.

Discussion

In the presented case, a succession of failures needs to be pointed out. The sacral fractures were not recognized at first on a standard anteroposterior pelvic radiograph. No specific clinical examination (i.e. posterior stress maneuvers) was performed to identify posterior pelvic ring injuries. CT scan of the pelvis was not deemed necessary. Missed fractures have led to underestimation of the severity of the fragility fracture pattern, resulting in inadequate treatment and rehabilitation [4,5]. In the original series of Rommens et al. unilateral isolated pubic rami fractures were far from comprising the majority of all FFP (43/245 = 17.5 %). This supports the need for CT-evaluation of all low energy pelvic ring lesions with pubic rami fractures. Whenever an anterior pelvic ring lesion is present, there is a high risk of a concomitant posterior ring lesion generally missed on conventional radiography [7].

FP is a real phenomenon, occurring in a minority of FFP patients. Female patients are known to be at higher risk. Repeated CT scan is positive in nearly 40 % of patients with continuing pain or restricted mobility during conservative treatment [8]. In our case, a sacropasty was performed to treat a FFP type IVb. Unfortunately, sacropasty does not allow bone healing and presents high risk of cement leakages in case of transforaminal fractures. This strategy failed to avoid FP and recurrences of pain.

Therefore, a percutaneous ilio-lumbar reduction was attempted with cemented augmentation. The Longitude 2 system, usually used for young patients with Chrome-Cobalt rods, seems to be too rigid in osteoporotic bone. Even with cemented screws, pull-out occurred; finally, only ilio-sacral screws had fixed the fracture. Titanium rods or alternative fixation such as transiliac internal fixation or transsacral bar osteosynthesis should have been considered instead [9]. Indirect reduction maneuvers as described by Ruatti et al. in supine position could be used to correct the sagittal balance in spinopelvic dissociation [10].

We conclude that a thorough clinical and radiographic examination, including conventional x-rays and CT-scan, is needed to correctly understand and classify the pelvic fracture of every patient of old age. Correct classification leads to adequate treatment.

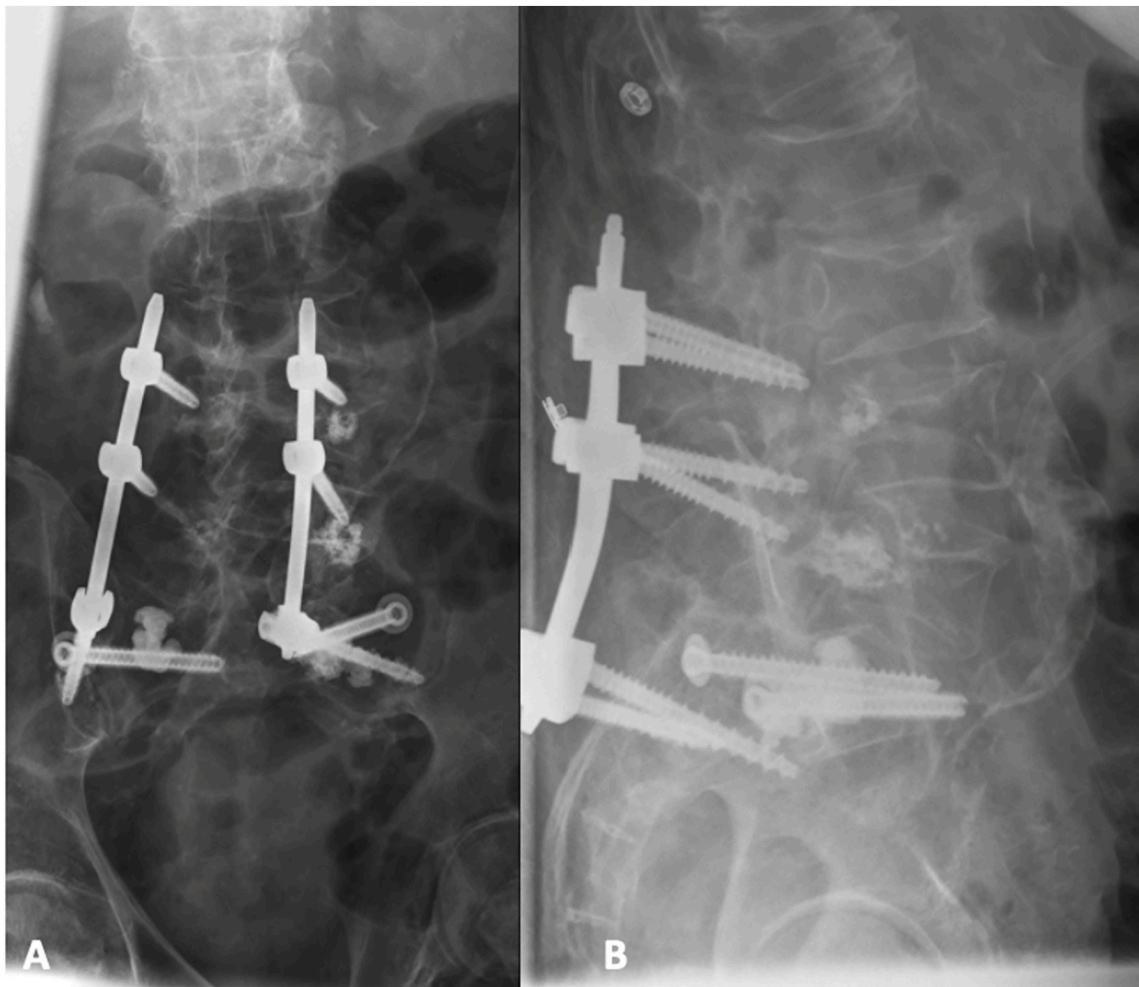


Fig. 4. A Anteroposterior lumbar radiograph showing ilio-lumbar fixation with pulled-out cemented screws and ilio-sacral screws through previous sacropasty. B Lateral lumbar radiograph showing ilio-lumbar fixation with pulled-out cemented screws and ilio-sacral screws through previous sacropasty.

Sacroplasty is not a sufficient treatment for unstable FFP of Type IV.

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Declaration of competing interest

The authors have no conflicts of interest to disclose in relation to the present study.

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