REPORT OF TWO CASES OF ANTERIOR RECONSTRUCTION IN L5 BURST FRACTURE

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Résumé : Les fractures en éclatement L5 sont rares et dues à un traumatisme à haute énergie. Ces fractures peuvent provoquer une compression de la queue de cheval et entraîner un déséquilibre sagittal. Il s'agit de différents modes de traitement tels que la chirurgie postérieure uniquement, la chirurgie antérieure uniquement ou la chirurgie combinée. Nous rapportons 2 cas de fracture par éclatement L5 prise en charge avec succès par chirurgie en 2 étapes avec reconstruction antérieure de la vertèbre L5. Nous discutons de la meilleure stratégie de traitement chirurgical dans cet article.

Mots-clés : *Fracture par éclatement, Cinquième vertèbre lombaire, Chirurgie du rachis antérieur.*

Abstract : L5 burst fracture are uncommon and due to high energy trauma. These fracture can cause cauda equina compression and leads to sagittal imbalance. They are various way of treatment such as posterior only, anterior only or combine surgery. We report 2 cases of L5 burst fracture successfully managed by 2 stages surgery with anterior reconstruction of L5 vertebra. We discuss the best surgical treatment strategy in this paper

Keywords : *Burst fracture, Fifth lumbar vertebra, Anterior spine surgery.*

INTRODUCTION

Burst fractures in lower lumbar spine are uncommon [6,11]. These represented 1% of all lumbar spine trauma [4]. These fractures can be integrated into a polytraumatic [2,3] context due to the violence of the causal trauma.

Complex anatomic landmarks make anterior treatment difficult and dangerous. The vascular complex is the most challenging structure in this area. Usually the aorto-cave bifurcation is up to L5-S1 making easier anterior retroperitoneal approach for L5-S1 disk hernia. Never theless, making anterior L5 corpectomy and reconstruction needed to expose L4-L5 disk and a part of the body L4 vertebra. It needed to go up from the aorto-cave bifurcation with the interposition of aorta and vena cava.

It's well known that besides these anatomical difficulties, burst fracture of L5 frequently caused a loss of distal lumbar lordosis. The surgical treatment of these fractures should restore sagittal balance, weight-bearing ability and decompression of neural structures [10]. Nevertheless when there is neurological deficit, posterior decompression and fixation should be required in emergency prior anterior reconstruction [11]. It could be difficult to choose beetwen anterior, posterior or combined surgery and beetwen short segment fusion or long pedicle screw fixation [7].

We reported two cases of L5 burst fracture with compromised canal and severe neurological deficit. The difficulties and the different methods of anterior reconstruction and results are outlined in this paper.

CASES PRESENTATIONS

Case 1 :

A 20 years old man was referred to our department for lumbar spine trauma. A billboard dropped on his back 2 hours prior to coming to us. He presented with a severe back pain and physical examination showed cauda equina syndrom with complete weakness of lower limbs, bladder

incontinence and perineal anesthesia. CT scan reveled a L5 burst fracture with significant loss of height and bone fragment in vertebral canal (fig.1A). Posterior decompression and L3-S1 fusion was performed in emergency (fig.1B). Secondarily, an abdominal vascular angiogram specifed the position of the aorto-cave bifurcation. An anterior retroperitoneal approach was performed a week later. The patient was in french position.

we first repaired the right iliac common artery and vein (fig.2). From the anterior part of vessels and below we easily accessed L5-S1 disk. We went up to gently retract the aorta and vena cava to expose the L4-L5 disk and the lower part of L4 body. We performed corpectomy of L5 with interposition of a Harms size 18 cage beetwen L4 and S1 (fig.3A, fig 3B). Postoperatively, there was not motor function improvement and no related complication due to surgery.

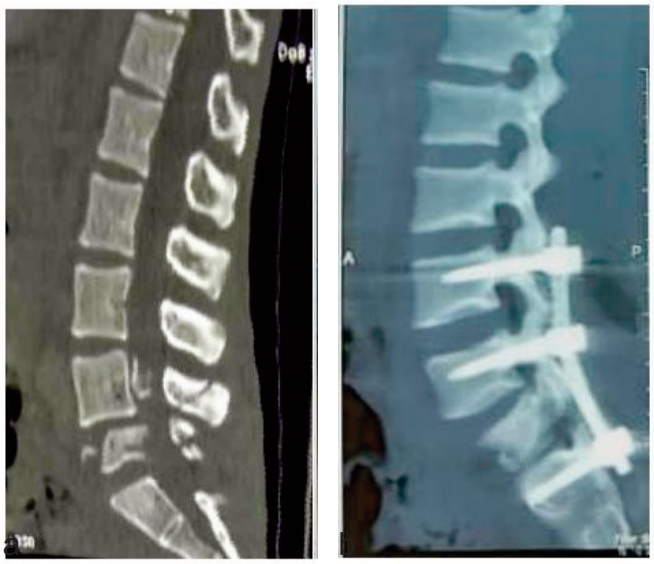

Figure 1: L5 burst fracture with vertebral canal reduction (A) with posterior first decompression and arthrodesis (B)

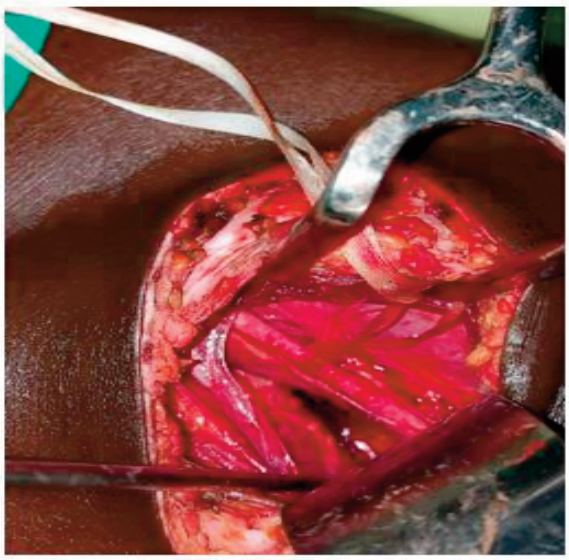

Figure 2 : Operative view showing left common iliac artery and vein

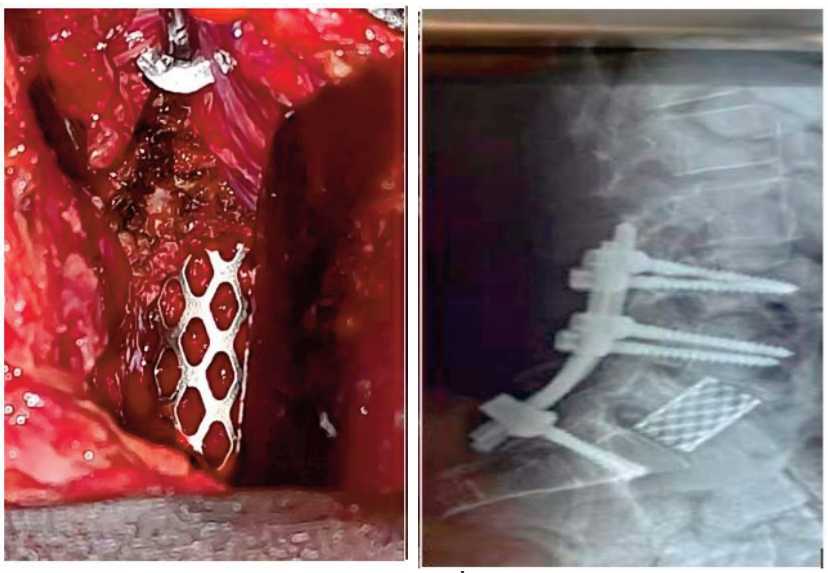

Figure 3 : Operative view after L5 corpectomy with interbody cage placement (A). Control of L5 cage placement (B).

CASE 2 :

A 43 year old man was involved in a traffic accident and had lumbar spine trauma.

He suffered from lumbar pain, partial weakness of lower limbs and urinary retention. Examination of other organs was clear. CT scan showed a L5 burst fracture with vertebral canal compromise. We first performed posterior decompression with L3-S1 arthrodesis and anterior L5 corpectomy and reconstruction 5 days later. Lower limbs weakness significantly improved from 2/5 to 4/5.

DISCUSSION

L5 Burst fractures are uncommon and are sometimes associated with others injuries such as colon or rectum damages [5]. These fractures can have important management problems. Ramieri et al [11] reported 19 cases of neurological burst fractures. These authors assumed posterior decompression and lumbosacral fixation as main treatment.

They insisted on that decompression and good lombosacral alignement could be a fact of good follow-up ; even if they saw loss of vertebral body height and anterior approaches were an option when decompression and fusion where needed [11]. When analysing their results, they mainly sustained A3.1 and A3.3 fractures. Even the results were good at 1 year follow-up, we had to keep in mind that the anterior defect in these cases were wide so that long time follow up could show failure of the posterior instrumentation.

Posterior alone strategy without vertebral reconstruction and can cause instrumentation failure [9]. Likachev et al [8] studied about 58 patients with L5 burst fractures and in posterior only treatment patient, 26% developed instability on pedicular screws 12 months after surgery needing anterior reconstruction because of wedging anterior defect.

These fractures can also be managed by posterior Arthrodesis and L5 corpectomy [1]. Doing this required posterior only vertebrectomy. This had the advantage of single time neurological decompression, arthrodesis and anterior reconstruction. however postoperative neurological impairement could be high and could an issue to people without neurological deficit and even to those who had neurological impairement of lower limbs as this deficit could improved.

The vertebrectomy in the context of traumatic injury could to lead major blood loss (9,13). Liu et al [9] showed an average blood loss of 2800 ml (1200 ml - 4000 ml) on twenty case serie of throracolumbar burst

fracture treated by partial posterior vertebrectomy. The bone resection are wide in vertebrectomy to safely insert the cage. This resection allowed the need to have strong arthrodesis by inserting screw in alar-iliac and in sometimes L3.

Even posterior vertebrectomy and fusion respect the goals of lumbar burst fracture treatment such as neural decompression, restoration of spine alignement and anterior column reconstruction, potential severe complications had to limit its use in an emergency context.

The classic combined anterior-posterior approach in single surgery can be used for lumbar burst fracture. The main disavantages for some authors were the lenght of time of the operation and blood loss [9].

In adequation of the goal of lumbar burst fracture treatment, we prefer and teach posterior and anterior approaches in double time surgery. first posterior surgery could permit to do neurological decompression if there is an impairement through a laminectomy and arthrodesis or simple arthrodesis if there is no deficit.

The relatively simple character of this laminectomy limit the risk of cauda equina syndrom contrary to posterior vertebrectomy. The second time anterior surgery can be delayed for a week for L5 reconstruction and eventually ventral lumbar canal decompression. The surgery in double time had the advantage to limit postoperative infection as each operation is time saving and it limited blood loss. The arthrodesis contrary to posterior vertebrectomy can be shortened.

Two time surgery had the main disavantage of extending hospitalization. We used this technic with success in two cases. For Ramieri et al [11] when there was neurological deficit ; posterior decompression and fixation should be required in emergency prior to anterior reconstruction. There was particular cases of L5 burst fracture with dural laceration and defect that could be difficult to repair anteriorly [12]. In these selected cases the dura repair anterior column reconstruction could be achieved in a posterior only surgery [12].

CONCLUSION

L5 burst fracture are uncommon with multiple challenges of its anterior reconstruction. They are various ways to treat this fracture such as posterior only surgery, anterior only technic and combined surgery in single or two stages surgery.

We successfully experienced combined posterior-anterior in 2 times surgery with short arthrodesis. The complex anatomic landmarks should not limit the use of an anterior L5 reconstruction technic.

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