Case report

Early migration of bone graft causing sigmoid colon perforation after trans-foraminal lumbar interbody fusion

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ABSTRACT

Background: Tran foraminal lumbar interbody fusion (TLIF) is a well accepted and standard technique of achieving spinal fusion using pedicle screws, cage and bone graft. We are presenting here a case of L4–L5 lumbar canal stenosis managed with TLIF that presented with sigmoid colon perforation due to bone graft migration 4 days after surgery.

Case report: A 35 years old female underwent open TLIF (from right side) with decompression for L4–L5 lumbar canal stenosis. On 4th post op day she started having abdominal pain and distension. After radiograph revealed gas under diaphragm emergency laparotomy was done and 1 by 1 cm sigmoid colon perforation seen near recto-sigmoid junction. Bony spicules with sharp edges were seen embedded inside the perforation.

Discussion: The purpose of this case report is to present a rare complication and to raise awareness and high index of suspicion among spine surgeons for prevention, early detection and treatment.

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1. Introduction

Trans foraminal lumbar interbody fusion (TLIF) is a well accepted and standard technique of achieving spinal fusion using pedicle screws, cage and bone graft. Harms and Rolinger¹ first reported its use in 1982 by inserting bone graft packed in mesh via a transforaminal route into the disc space, and thus obviating the need to remove contralateral lamina and spinous processes, leading to increased surface area, available for posterior fusion.

Spinal surgery can rarely be associated with complications by damaging adjacent visceral structures like bowel and blood vessels. The incidences of bowel and vascular injuries intra-operatively were 0.06 and 0.2 per 1000 cases respectively according to national database analysis from 2002 to 2011 by lara et al.². Dislodgement and migration of graft and cage have also been associated with injury to bowel in lumbosacral region and esophagus and trachea in cervical area in cases operated through anterior approach^{3,4}.

There are a few case reports^{3,5} of late migration of graft after a year or more after surgery by anterior approach, however we have not found any report of early migration of graft with in a few days

of surgery and associated bowel perforation after TLIF through posterior approach. We are presenting here a case of L4–L5 lumbar canal stenosis managed with TLIF with cage and bone graft anterior to it that presented with sigmoid colon perforation due to bone graft migration 4 days after surgery.

2. Case report

A 35 year old female patient had symptoms of lower limbs pain with neurogenic claudication on walking around 300 m distance and bilateral positive straight leg raise test. Patient also had a previous history of typhoid 12 years back.

She underwent open TLIF (from right side) with decompression for L4–L5 lumbar canal stenosis with ligamentum flavum hypertrophy and B/L lateral recess neural foraminal narrowing (Fig. 1). It was an open transforaminal Interbody fusion. All the screws were inserted open. Disc preparation was done in a standard manner with the help of measurement marked shavers and disc rongers. First disc space depth was determined under image intensifier and due care was taken, not to advance any instrument beyond safe depth. There was no suspicion or evidence of anterior annulus violation intraoperatively. After preparation of disc space, first bone graft was packed anteriorly with the help of a funnel and then cage was inserted.

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Fig. 1. Preoperative MRI showing lumbar canal stenosis at L4-5 with anterior disc herniation suggestive of incompetent anterior longitudinal ligament.

Fig. 2. Postoperative lumbosacral radiograph showing TLIF L4-L5.

Patient was doing fine for the first 3 days after surgery and was accepting orally well. Her postoperative X-rays are shown in Fig. 2. On 4th post op day she started having abdominal pain, abdominal distension with sluggish bowel sounds and high-grade fever. Abdominal radiograph revealed gas under diaphragm. She was taken up for explorative laparotomy. After the peritoneum was opened gush of air was seen and 1 by 1 cm sigmoid colon perforation seen near recto-sigmoid junction (Fig. 3). Bony spicules with sharp edges were seen embedded inside the perforation (Fig. 4). They were removed and perforation closed and loop colostomy performed. Patient was discharged in stable condition

Fig. 3. Bony spicules recovered from sigmoid colon perforation site.

Fig. 4. Bony spicules recovered after explorative laparotomy.

on 3rd post op day when she was allowed orally and fever subsided. Later colostomy was closed, however patient developed incisional hernia, for which another surgery was performed after 4 months with mesh repair. She is now around 2 years in follow up and is doing fine.

3. Discussion

TLIF is a standard spinal fusion procedure with less incidence of neurological injury and with advantage of sparing the lamina; facet and pars of contralateral side which provides increased surface area for fusion as compared to posterior lumbar interbody fusion (PLIF). Anterior retroperitoneal and transperitoneal approach to the lumbosacral spine may be used for the same indications as PLIF and TLIF procedures however they have higher potential for bowel

and vascular complications. To the best of our knowledge bowel injury after TLIF has not been described in past in English literature.

Ruf et al.³ have described the perforation of sigmoid colon due to intradiscal spacer dislocation 4 years after the anterior endoscopic implantation of spacers and posterior instrumentation. Cakmak et al.⁵ have reported a case of cecum perforation one year after L5 S1 posterior interbody fusion with femur graft through anterior approach. Both these authors have suggested frequent radiographic follow up in postoperative period to show complications early enough to avert the severe consequences. Cho et al.⁶ have reported intraoperative ureteral injury after inadvertent violation of the inter-transverse space during posterior lumbar discectomy. Oran et al.⁷ reviewed the literature on visceral perforation following lumbar disc surgery and reported a total of 22 cases (14 at L4-5, 3 at L5-S1, 5 unspecified). Majority of them involved small bowel, large bowel injury was quite rare.

When this patient presented with perforation peritonitis, we had several questions in mind. First question was whether this was due to some intraoperative injury. However, several factors were against any intraoperative injury and possible occurrence of intraoperative bowel injury is ruled out by initial normal postoperative five days without any bowel symptom, approach to TLIF was from right side, while sigmoid colon is much below and towards left side. Second question was whether can it be a complication of hardware placement but postoperative CT scan ruled out this possibility. As this was an open TLIF, possibility of injury via guide wire during minimally invasive TLIF was also not there. Another question was, whether it is due to some pre-existing typhoid ulcer. Intraoperative findings ruled out all the above possibilities and confirmed sharp bony spicules as cause of sigmoid colon perforation.

The occurrence of left sided bowel injury in a right sided approach may be explained by migration of bony spicules through a rent in annulus, which kept on moving towards left due to natural left sided movement of adjacent bowel loops, till sharp edge of bony fragment got stuck at the site of perforation.

We have used the standard third generation cephalosporin as per our hospital protocol. The reason for only graft migration and no cage migration can be probably due to rent in annulus was not

large enough to allow passage of cage in comparison to bone fragments. Besides, cage is usually jam packed into disc space and has its inherent stability through its anchorage in endplates.

True incidence of bone graft migration is not known in lumbosacral spine. Factors that can potentiate graft migration include insecure placement, segmental instability, tear in annulus fibrosus, damage to anterior longitudinal ligament, too much disc resorption and excessive curettage of disc material. All these factors should be taken care of to prevent such complications. On retrospective evaluation of images, we could see anterior disc herniation in this patient, a potential indicator of anterior longitudinal ligament (ALL) insufficiency (Fig. 1).

We recommend a close monitoring and radiographic assessment of patients who complains of abdominal pain and distension in post-operative period after TLIF. We also suggest a careful review of imaging preoperatively to look for ALL insufficiency. The purpose of this case report is to present a rare complication and to raise awareness and high index of suspicion among spine surgeons for prevention, early detection and treatment.

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