

Peer Review File

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Reviewer A

1.

The introduction mentions that the transpsoas approach has a high incidence of complications related to the psoas. However, Figure 11 shows that the psoas is being widely expanded. Such a wide expansion will cause damage to the psoas muscle. I think that early postoperative weakening of the psoas muscle on the approach side is inevitable. Please provide details regarding early postoperative muscle strength, ambulatory status, recovery time, etc.

Also, please indicate if there were any hematomas in the iliopsoas region and, if available, present postoperative MRI coronal views (T2 and STIR).

Author's response:

Thank you for your comments. In this case we employed an pre-psoas approach rather than a trans-psoas approach. Figure 11 demonstrates the psoas being retracted posteriorly by the retractor at 12 o'clock, rather than expanded, or going through the trans-psoas per se.

The patient experienced pain over the left anterior thigh which was well managed on analgesia. There was mild weakness of left hip flexion, MRC grade 4, but weakness resolved on discharge.

We do not have post-operative MRI coronal views available for this patient as this is not a routine practice immediately after surgery. However, clinically there was no hematoma or swelling observed during her inpatient stay or on subsequent clinic follow-up.

We have added in elaboration on this on Page 3, Line 70-71 in our manuscript.

2.

The contralateral bolster on the opposite side is not visible in Figure 2. Since the counter on the opposite side is crucial for cage insertion in the prone position, could you please provide a clear photograph that clearly shows this aspect?

Author's response:

Thank you for your comments. Unfortunately, we did not take a photo from the contralateral side. We used similar hip pads on both sides. However, the ipsilateral hip pad was positioned more caudally to allow for more space for our surgical incision. We do note that there are some companies that offer special positioning systems (contralateral bolster and distraction of the iliac crest), but this currently not available in our center. We have also revised the main manuscript as the proper terms to be used is the hip pads rather than bolster. (Page 4 Line 79) Thank you for highlighting this.

3

If you have dynamic X-ray images showing preoperative flexion, extension, left and right lateral bending, please provide them.

Author's response:

Thank you for your recommendation, we have added in preop flexion / extension views to Figure 1. (Page 3 Line 61) Unfortunately, we do not routinely perform preoperative lateral bending views.

4

In Table 1, it is mentioned that prone-positioned OLIF has an advantage in navigation. However, considering the distance from fiducials to instruments, I personally believe that navigation could be a disadvantage. Could you please explain your perspective on why you consider navigation to have an advantage in prone-positioned OLIF in this context?

Author's response:

Thank you for your excellent question. We have found that the prone position is more stable compared to the lateral position as there is less toggle and movement as the patient is secured firmly on a Jackson table by hip pads in the prone position, rather than held in position by straps and tape in the lateral position. In addition, placement of navigated pedicle screws in the prone position is a familiar and predictable technique with better ergonomics over the lateral position. We have highlighted this in our paper in Page 6 Line 135-137. Navigation also reduces the amount of radiation to the surgical team especially in the setting of lateral surgery, where locating the disc space and screw placement may require multiple fluoroscopy images.

We have added in elaboration on this point in our discussion on Page 6, Lines 143-147.

5

In Table 1, it's mentioned that there are disadvantages to the prone-positioned OLIF in obese patients. Could you explain the meaning of this statement? Based on Figures 5, 6, 7, 8, and 11, it appears that your incisions and dissections are quite extensive, so can I assume that you're describing the challenges in achieving a clear field of vision into deeper structures? Regarding the risk of intestinal injury, I think that the prone position is safer, especially for obese patients. What is your considered opinion on this matter?

Author's response:

Thank you for your query. Yes, your assumption is absolutely correct. We observe that in obese patients with greater abdominal girth especially when the patient is placed prone, as the soft tissue will splay outwards. As such, deeper and longer retractors are required to reach the disc space. This makes surgery more difficult in a few ways.

Visualization is poorer

The ergonomics for discectomy is less efficient as instruments are much longer

There is a greater propensity for retractor loosening

We have added in elaboration on the above point in Page 7 Lines 160-163 and added in a reference (Reference 11).

We do not have any case of intestinal or vascular injury.

We have also corrected a typo error in Page 4 Line 92 clarifying that it is the retroperitoneal space rather than peritoneal space we are entering. Thank you for allowing us to clarify this point.

Reviewer B

This case is a novel technique and written with good outcome for this patient.

I have several concerns:

1. Instrumentation was performed at levels without degeneration T12-L1, L1-L2. Explain the rationale for instrumentation in this case.

Author's response:

Thank you for your question. Yes, we agree that the levels for instrumentation is highly debatable, and it would be reasonable to perform skip instrumentation. However, during our multidisciplinary meeting of spine surgeons, the overall consensus was to perform a longer fusion to span these levels as there were already signs of mild degenerative changes.

2. There is degeneration of T11-12, if instrumentation is considered why was an interbody cage not used? Put a explanation in discussion with references.

Author's response:

Thank you for your query. For T11/12 a posterolateral gutter fusion was performed, instead of a interbody cage. We agree that use of an interbody cage at this level would also be highly effective for fusion in this case.

3. Based on images there is no improvement in lumbar lordosis. Can you demonstrate radiographic improvement using measurements?

Author's response:

Thank you for your question. We have attached preop and postop mid sagittal CT scan cuts, demonstrating a mild improvement of lumbar lordosis from 32.7 degrees preop to 40.6 degrees post op.

We have added this in accordingly (Page 6 Lines 128-130), and added in a new Figure 9 to demonstrate this.

4. There is loss of disc height in post op image. Is this due to surgical technique leading to early subsidence?

Author's response:

Thank you for your question. The reduction in disc height could be due to early subsidence as patient has stage 4 chronic kidney disease resulting in poor bone quality. This can also be due to the settling effect of the cage onto the endplates upon mobilizing. However, it went on to complete fusion at 1-year followup.

5. How can this case be adopted by other surgeons as a method of treatment for cases involving multilevel DDD especially involving L5-S1? Add this as a possible use of this technique in discussion.

Author's Response:

Thank you for your question. We believe the prone lateral approach is especially useful when multiple levels of degeneration need to be addressed, as it allows for simultaneous posterior and lateral approaches to the spine in a single position. It is also useful for simultaneous manipulation whereby posterior releases and decompression can be performed whilst a lateral cage can be inserted followed by sagittal realignment with posterior instrumentation.

We have added this into our discussion as requested on Page 6 Lines 131-134.

However, addressing L5/S1 pathology is the main limitation in the prone-lateral approach. It is not possible to insert a large interbody cage from the side due to anatomical challenges from the iliac crest. As such, if a surgeon needs to address multilevel DDD + L5/S1, an option is to perform

An ALIF followed by a prone-lateral or,

Prone-lateral with a L5/S1 TLIF or,

Dual position, lateral and posterior surgery (OLIF/XLIF/XALIF) to tackle all segments from L2-S1.

We have added this into our discussion as requested. (Page 7 Lines 155-159)

6. Add in technique the thoracic Decompression and instrumentation in detail with corresponding photos, include post op photo of skin incisions and instrumentation if available.

Author's Response:

Thank you for your recommendation. Unfortunately, we do not have any post operative photos of the skin incisions. The thoracic decompression was performed via a standard open laminectomy and removal of the flavum and part of the facet joints to reveal the underlying spinal cord.

7. Group pictures together example 2,3 & 4 can be 2 A.B.C in the same image. 5&6, 7&8, 9&10 this will also allow you to add other images showing posterior surgery.

Author's response:

Thank you for your recommendation. We have grouped our images as suggested.

8. Correct spacing of citations throughout paper.

Author's response:

Thank you for your comment. We have made the relevant adjustment.

9. Line 103 correct 3 to 5 cm spacing

Author's response:

Thank you for your comment. We have made the relevant adjustment.

10. Include citation of each advantage in Table 1.

Author's response:

Thank you for your comment. We have included the relevant citations as requested.

11. In the case what other objective indices were used to demonstrate clinical improvement. No grade of power described upon discharge. Was ODI used pre and post op or JOA scoring system?

Author's response:

Thank you for your recommendation. Her mJOA score improved from 12 preoperatively to 15 postoperatively. We have included these details as accordingly. (Page 3 Line 72-73)