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Case Report

Impending Cauda Equina Syndrome Requiring Decompression in Pregnancy – Obtaining Consent and a Novel Surgical Technique

Fabian Wong[1]*, James Geddes[1], Anna Kuligowska[1] and Bahram Fakouri[1]

[1]Trauma & Orthopaedic Surgery, Guy's & St Thomas' Hospital NHS Foundation Trust, London, United Kingdom.

***Corresponding Author:** Fabian Wong, Trauma & Orthopaedic Surgery, Guy's & St Thomas' Hospital NHS Foundation Trust, London, United Kingdom.*

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Abstract

A 33-year-old female in her 5th week of pregnancy presented with an acute exacerbation of chronic low back pain and new onset bilateral sciatica, but normal motor and sensory function. She underwent an urgent MRI scan of her lumbar spine which demonstrated a massive disc extrusion at L4/5 causing severe canal stenosis and compression of the cauda equina. The treatment options and risks were discussed with input from specialities including spinal surgery, obstetric and anaesthetic teams. After 36 hours she developed a left sided foot drop and underwent urgent decompression with informed consent. We used a novel surgical technique to avoid the use of intra-operative ionising radiation, thus minimising any risk to the foetus. This case highlights the importance of a careful, patient-centered, multidisciplinary approach to the consent process.

***Keywords:** Cauda Equina Syndrome; Pregnancy; First Trimester; Consent; Spinal Surgery; Discectomy; Foot Drop.*

Introduction

Cauda equina syndrome in pregnancy is rare, but poses challenges with consent and surgical technique. Its presenting symptoms can be masked by those associated with pregnancy and a high index of suspicion is always required.[1] A missed diagnosis can cause significant disability and have substantial medicolegal implications.

This case shows the benefit of collaboration between spinal, obstetric and anaesthetic teams in order to deliver fully informed consent for surgery, tailored to the patient's specific situation. It demonstrates it is possible to operate on these patients using anatomical landmarks instead of intraoperative fluoroscopy, minimising any exposure of ionising radiation to the foetus.

Case Report

A 33-year-old female teacher trainer presented in her 5th week of pregnancy with an acute exacerbation of her chronic low back pain of 2 years duration, associated with new onset bilateral sciatica. Full neurological examination at presentation did not reveal any objective weakness, sensory disturbance or sphincter dysfunction. Due to her bilateral sciatica an urgent MRI scan of her lumbar spine was organised. The MRI scan demonstrated progression of a pre-existing disc protrusion at L4/5 which was diagnosed two years prior, with a new disc extrusion causing severe canal stenosis and compression of the cauda equina (Figure 1 and 2).

Given the radiological findings, the patient was counselled that while this wasn't a life-threatening condition, neurological deterioration could have profound consequences on her quality of life. The patient requested to discuss any decision with her husband, particularly regarding the risks to the foetus, implications of potential long term sphincter dysfunction and its impact on her family and social life. Unfortunately, her husband was out of the country due to a family emergency.

The obstetric team was contacted to perform an early pregnancy scan which detected a single intrauterine pregnancy of unknown viability. They counselled the patient regarding the surgical and radiation risks to the pregnancy, including the spontaneous miscarriage rate of 20-25% of all pregnancies prior to the 12th week of gestation. A consultant spine surgeon gave the option of using anatomical landmarks instead of fluoroscopy to minimise risks to the foetus, although this increase the risk of a larger surgical scar and incorrect level surgery. The patient had an informed discussion with the orthopaedic, obstetric and anaesthetic teams and considered the risks with her husband.

The patient eventually consented to surgery on the second day of her admission, but developed a unilateral foot drop later that day. Apart from the unilateral L4 weakness she also lost the ability to dorsiflex her hallux against gravity. All other findings of the neurological examination were normal, including perianal sensation and sphincter function. Due to her evolving neurology, she was listed for an emergency decompression for that day. The patient was keen to avoid the use of ionising radiation, but agreed that the image intensifier would be on standby if it became absolutely necessary. All risks and benefits of lumbar spine discectomy were formally documented in the consent form, explained to the patient and signed by both parties.

Figure 1: *Sagittal T2-weighted MRI of the lumbar spine showing a massive L4/5 extruded disc. Note the sacralised L5 vertebra with the vestigial L5/S1 disc.*

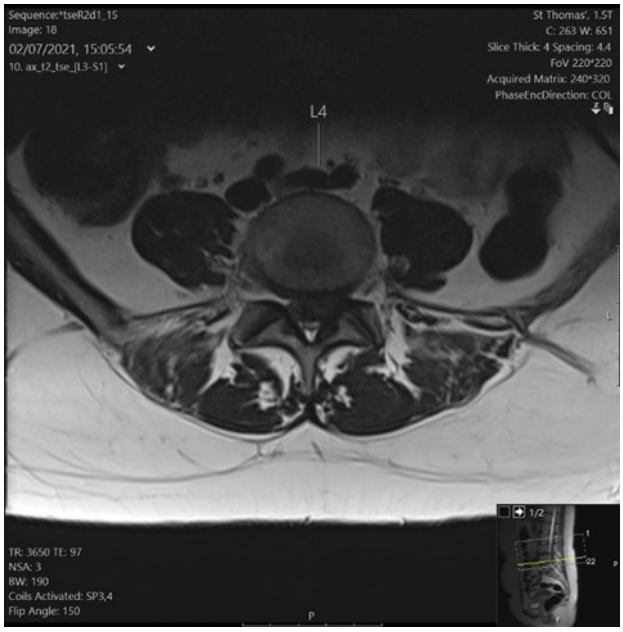

Figure 2: *Axial T2-weighted image at the level of L4/5 is shown here.*

Surgical Technique

This patient underwent a left L4 hemilaminectomy with removal of the disc prolapse and extruded disc fragments from L3/4 to L4/5. Anatomical landmarks were utilised to determine the operative level rather than intraoperative fluoroscopy. The L4/5 level was determined by using the level of the iliac crests, which were easily palpable. The lower L3, L4 and upper L5 lamina on the left side were exposed. An initial laminotomy and flavotomy of upper L4 was made at L3/4 to expose the L4 lateral recess, which was free. It became apparent this level was in fact L3/4; the L4/5 recess should be occupied with extruded disc material, and the level was far too low to be L2/3. Accordingly, we performed a left sided laminotomy and flavotomy at the next level down which showed the massive disc prolapse. A conservative clearance of the L4/5 disc space was performed following medialisation of the thecal sac and L5 nerve root. The left sided L4 laminotomy was subsequently converted to a hemilaminectomy to remove the sequestre which had migrated cranially and was lifting the L4 nerve root. There were 2 large fragments at the L4/5 level, and a large extruded fragment more cranially, all of which were removed. The thecal sac and L5 nerve root were fully decompressed, and the L4 exiting nerve root was followed to its exit foramen and freed.

An alternative to the above technique in the absence of fluoroscopy would have been to start the incision slightly more distally and expose the sacrum such that the L5/S1 interspace could be identified, and then count upwards. This is less appropriate for higher levels due to the need for a much larger incision, and given the cranial extension of her massive disc prolapse and the need to ensure adequate decompress at the L3/4 level, the former method was felt to be more appropriate in this patient. Identification of the sacrum could have been used by extending the dissection distally if there was any doubt over the level, but thankfully this wasn't needed.

Clinical Outcome

The patient made good progress with physiotherapy and was discharged home on post-operative day 2 with an ankle-foot orthosis to support her foot drop. Follow up plans were made for ongoing physiotherapy and review in the orthopaedic clinic. Regarding her pregnancy, scans were arranged by the obstetric team at week 1 and 2 post-operatively, demonstrating a viable foetus. Unfortunately, the patient had a miscarriage 4 weeks post-operatively (10th week of pregnancy) and underwent surgical management.

At the time of writing, the patient still has a foot drop with a MRC grade of 1/5 in ankle dorsiflexion and 3/5 in extensor hallucis longus. Despite this, the patient was happy with her care throughout, and felt fully in control of her decision at all stages.

Results & Discussions

Symptomatic lumbar disc herniation presents in approximately 1 in 10000 pregnant women, of these 2-6% will have cauda equina syndrome.[1] Around 50% of pregnant women will present with lumbar back pain at some point. This is felt to be due to a combination of intrauterine weight, relaxation of abdominal musculature and hormonal changes causing ligamentous laxity; particularly relaxin production in the third trimester.[2] Some of the early symptoms of impending cauda equina syndrome may be falsely attributed to pregnancy, for example sciatica and altered bowel and bladder function. It is vital to take a detailed history in these patients, specifically asking about the nature of any incontinence. A high index of suspicion is always required in cases where there is any form of bilateral radiculopathy, sensory disturbance in the saddle area or sphincter dysfunction. Incorrectly ascribing these symptoms to pregnancy can cause a delay in diagnosis and worsening neurological function; such cases have been reported in the literature.[3]

There have been several other case reports of discectomy for acute cauda equina syndrome during pregnancy, including a double-level discectomy in which the patient's neurological function fully recovered and she went on to deliver a healthy male baby. [1,3-7] There was also a case report of cauda equina syndrome presenting during labour, for which the patient underwent discectomy following delivery.[8]

A key aspect highlighted in this case was the importance of the consent process. Montgomery vs Lanarkshire 2015 was a landmark case in shaping the current medicolegal landscape for what informed consent should entail.[9] Our case highlights how seeking input from other specialties would help to counsel and inform patients on material risks relevant to them, and where possible sufficient time should be given to weigh up potential risks and benefits with family and friends. In the event of emergent surgery, co-operation and timely input from all relevant clinical teams is required in order to enable these discussions to take place.

To our knowledge, our surgical approach was not previously published in the literature. The use of surface anatomy and lack of fluoroscopy was unusual, but logical, in the context of an evolving cauda equina syndrome during early pregnancy. An interesting historical technique in determining spinal level near the lumbosacral junction is the difference in the percussion note between sacrum (hollow) and L5 vertebra (solid). In our case, both surgical and obstetric team had extensive discussion with the patient, and she was fully informed with regards to the risks of intra-operative ionising radiation on miscarriage and congenital malformation, as well as the risk for not using intra-operative imaging such as wrong-level surgery, length of surgical scar and increased operative time.

As stated previously, our patient was fully engaged in the consent process, given time and support before making an informed decision, and despite her neurological dysfunction, was happy with the care she received.

Conclusions

- Cauda equina syndrome in pregnancy is rare and symptoms can be clouded by those attributable to the pregnancy. A high index of suspicion is needed for cauda equina syndrome in all cases.
- Effective communication between the multidisciplinary team is of huge benefit for informed consent in complex cases such as this, to give the patient the best means possible to understand the risks and benefits which are particularly relevant to their personal circumstances and situation.
- Decompression and discectomy is possible, at least for lower lumbar interspaces, without use of the image intensifier in pregnant patients in whom ionising radiation may be harmful to the foetus. In these cases the knowledge and use of anatomical landmarks is essential, and the relevant risks, including wrong-level surgery, need to be clearly explained to the patient for them to make an informed consent.

Conflict of Interest

The authors declare no conflict of interest.

Acknowledgement

Not applicable

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