Introduction

I refer to the article by Yeung, and co-authors on the suggestions for a practical and progressive approach to endoscopic spine surgery training and privileges [1,2]. “Endoscopic spine surgery blends skill sets, technology, and clinical application from both surgical spine and interventional spine”. I concur with Yeung’s views that “the lines between surgical and nonsurgical treatment are blurred by technology and evolving practice patterns. Some interventional spine practitioners are able to provide safe and effective endoscopic spine surgery, but the training and practice standards have to be established.” Furthermore, the learning curve for specific ESS procedures may also need to be defined to ensure patient safety [2,3].

Despite having been fully dedicated as an Interventional Spine Physician (ISP) of many years, performing many spinal procedures ranging from percutaneous disc ablation, disc nucleotomy, radiofrequency medial branch neurotomy, implantation of spinal cord stimulators, intra thecal pumps, dorsal root ganglion modulation; venturing into ESS was not an easy task – both clinically and administratively. Before embarking on the ESS journey, one should have adequate experience in disc ablation treatment [4]. Being able to handle disc pathology, starting from smaller needles (Nucleoplasty/IDET needles) and progressing to larger cannulas such as Disc FX, allowed me to progress to minimally invasive spine decompression. Having gone through hundreds of Nucleoplasty (Coblation® using radiofrequency vaporization of nuclear tissue) and percutaneous disc decompression (Dekompressor®) technique. Bone preservation and judicious dissection using less quantifiable extraction of disc material to achieve volume reduction, there remains many patients with a sizeable disc herniation having mechanical nerve root compression that would benefit from a more directed approach to decompress the affected nerves.

Endoscopic Journey as an ISP

My ISP journey started with the teachings and mentoring from Anthony Yeung. His “inside out” YESS (Yeung Endoscopic Spine System) transforaminal approach, showed that disc decompression using fluoroscopically guided percutaneous techniques, is an easier, safer, readily reproducible, and more cost-effective treatment [5]. It creates less surgical morbidity than traditional open surgical methods [5]. Having a good grasp of the radio-anatomy of the spine with reference to the underlying structures (e.g. medial pedicular line, posterior vertebral line and spinal canal shadow) rapidly advanced my learning and competency. Placement of the guide wire within the targeted disc area was an extension of Disc FX technique. The “inside out” approach gave me confidence during the initial handling of endoscopic equipment. Over time, the progression towards an “outside-in” approach (pioneered by Thomas Hoogland via the Thessys by Joima) was more helpful in decompression of larger disc herniation and visualisation of the transversing nerve root. Learning and applying principles from Ruetten to decompress canal stenosis and lateral recess stenosis via translaminar endoscopic technique was an extension from interlaminar disc decompression of L5/S1 (especially patients with difficult access to L5/S1 via the transforaminal approach) [6].

Can interventional pain practitioner learn and be competent in ESS? My humble opinion would be with adequate training and exposure, an ISP can be trained adequately. The approach to disc ablation via nucleoplasty, IDET and Disc FX has been delivered professionally within the perview of ISP. These procedures approached the disc via the transforaminal access. Traditional spine surgeons have not historically embraced the field, leading to ISP starting to fill the vacuum. Many of the skills developed during training as an ISP translate directly to the practice of ESS [2]. The size of the endoscopic cannulas ranging from 7 – 9 mm OD is bigger than that of Disc FX. As ISP starts on this learning process, one would need to acknowledge the limitations of foraminal access and have an adequate knowledge of the Kambin’s triangle and its boundaries, to allow for safe delivery of this technique. Bone preservation and judicious dissection using less...
traumatic instrument under local anaesthesia coverage would be the initial experience of the ISP; until one is used to looking at the tissue structures via the scope. To minimize complications including failed back surgery syndrome, one should carefully select suitable patients and start with less complex patients’ spinal pathology. Endoscopic techniques can vary and will likely depend on the “surgeon factor” in obtaining favourable results [7]. The ability to evaluate the area in and around the foramen and nerves opens a whole new dimension for the evaluation and treatment of common and complex back pain [7]; ISP has been contributing to this additional dimension of providing pain relief in refractory pain following post-laminectomy syndrome.

Surgical risk such as nerve injury, bleeding, dura tear and infection should be thoroughly discussed with patients especially for procedures such as epidurolysis, SELD (trans-sacral epiddiscoscopic lumbar decompression, spinal cord stimulator, intrathecal pump implantation and disc ablation. The management of the risk in ESS is no different from those mentioned above. Patients need to be informed about the possibility of a staged surgery in case of complication. The need for a surgical back up cannot be overstated; this arrangement mirrors that of cardiothoracic surgeon being a backup for interventional cardiologist in percutaneous coronary angioplasty.

Training via hands-on cadaveric workshops has been invaluable for me to develop safe approaches in ESS [7]. Training under different endoscopists, who have their own favoured style and technique to overcome possible obstacles, were important in my learning journey. I had to invest additional training in understanding principles of surgical spine care, complication recognition and management and the biomechanics of the spine [2], to bridge the gaps in my training of spine care. Having gained experience and interacting with the “best” in the field, I was able to share my limited experience at various minimally invasive spine conferences (Asean and Asian MISST) in my region.

Case Series

The following case series of 51 patients underwent endoscopic lumbar spine decompression from July 2016 to May 2018, constituting of 16 cases of transfarominal lumbar disc decompression (L3/L4 – L4/ L5), 10 cases of interlaminar lumbar disc decompression (L5/S1) and 25 cases of interlaminar spinal stenosis decompression (L4/L5 or L5/ S1). Of the 51 patients, 27 were female and 24 were male with the average age of 50 years old for disc decompression and 70 years old for canal stenosis decompression. All patients reported V AS > 5/10. These values indicate a significant improvement in patients’ back pain and radiculopathy. Their average walking tolerance has increased by 77.6% and their satisfaction scores at 4.1 out of 5.

The persistence and recurrence of patient’s radicular pain is around 10%. Two patients from the transfarominal disc decompression and three patients from the interlaminar canal stenosis decompression group. One patient with L4/L5 grade 2B disc herniation developed recurrence of pain by 2nd week. The preop VAS 10/10 and post op POD1 VAS 3/10. By 2nd week, the VAS 5/10. The straight leg raise improved to 90/90 from 40/90. Repeat MRI showed inadequate decompression at the superior vertebral notch. Eventually, the patient underwent open laminectomy decompression at 4th week. Feedback from neurosurgeon revealed a small hardened disc fragment lodged at the notch during open surgery.

One patient had recurrence of pain at 6 months post procedure associated with a previous surgery with discectomy L4/L5 and DIAM space implant 4 years prior. There was back pain with radiculopathy from a L4/L5 grade 3A disc herniation. The preoperative VAS 8/10, postoperative VAS 2/10. Post procedure the straight leg raise was 80/80 from 40/70 and there was adequate pain relief for 5 months. Repeat MRI showed recurrence of disc herniation, likely to be compounded by the DIAM spacer. The patient underwent laminectomy decompression and fusion subsequently.

Two patients had persisting pain at one-month review - inadequate decompression of canal stenosis. These were early cases in the learning.
Discussion

It is imperative that backup instruments be available in case of any equipment failure. It was a difficult choice to make whether to abandon the procedure when the shaver failed. It may be perceived to be more acceptable to have a “failed back surgery” outcome than to have an asymptomatic dura tear. Recognizing the lack of equipment, and needing a neurosurgical input might have been the Hobson’s choice, hence planning it as a staged procedure. While dura tear is an accepted surgical risk, for the interventional spine physician, the treatment of this inadvertent outcome becomes a torching point, even if we could attempt to seal the tear with a blood patch or Fibrin Sealant patch. This 2% incidence of dura tear is arguably a modest comparison to the 1% to 7% reported for microdiscectomy surgeries [9]. Complication management has to be managed early in the pre-procedure planning phase. Extensive discussion is necessary to calibrate patient’s expectation and informed consent of these risks. While ISP undergoes training and learn the necessary anatomical knowledge, relevant skill set and selection of patients, the need to work closely within a multi-disciplinary set up prevails. Open surgical interventions could be a consideration for patients in a staged management plan. Similar collaborations between cardiothoracic surgeon intervening for interventional cardiologist and ISP being involved in the care of failed back surgery syndrome patients established the mutual need for inter-discipline care.

Persistent pain a ter spine surgery varies between 1% to 20% [10]. The 10% recurrence of pain in this case series is matched modestly within expectation. As an ISP, the ability to offer a minimally invasive procedure such as ESS to patients, ill the void needed to decompress the spine mechanically. I would expect the incidence of persistent pain to reduce over time.

To address the lack of formalized and peer reviewed training programs for evaluation of surgical skill and judgment, while self-evaluation is our moral compass, ISP needs to incorporate a morbidity regular peer review learning mechanism though it is not dedicated to just ESS. Efforts are made to ensure that performance standards are upheld adequately, such as starting our own cadaveric workshop.

Conclusion

As ISPs incorporate endoscopic spine surgery in our field of specialization, we must have adequate training and background experience. This is best practiced in a multi-disciplinary environment, together with neurosurgeon and orthopaedic surgeon alike. Each stakeholder should evolve by working together rather than be concerned about “protecting their turf” and using all the individual skills for treating their mutual patients [7]. The political sensitivity regarding ISP overstepping into orthopaedic territory regarding ESS should be set aside as in the example of China’s ISP embracing ESS [7]. Tracheostomy is a good example of various stakeholders working together for the best interest of the patient. ENT surgeon, intensivist (anaesthesiologist), respiratory physicians all can perform Tracheostomy. Within my own work, there are surgical colleagues acknowledge and support me as an ISP performing ESS, while others could be less accepting. I look forward to the synergistic collaboration amongst all stakeholders, especially in the area of training and accreditation, for the progress and evolution of ESS, especially taking the examples from China and Korea.

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