Expert's comment concerning Grand Rounds case entitled “Minimal access bilateral transforaminal lumbar interbody fusion for high-grade isthmic spondylolisthesis” (by Nasir A. Quraishi and Y. Raja Rampersaud; doi:10.1007/s00586-012-2623-2)

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Abstract

This Expert's Comment discusses the Grand Rounds Case entitled “Minimal Access Bilateral Transforaminal Lumbar Interbody Fusion for High-Grade Isthmic Spondylolisthesis” by Nasir A Quraishi and Raja Y Rampersaud. It puts a technically elegant surgical method for minimally invasive reduction and arthrodesis of isthmic spondylolistheses into the context of short and long term outcomes and questions the motivations for performing such minimally invasive procedures in the absence of any proven mid or long term advantages over more traditional techniques. In addition, the use of BMP in spinal arthrodesis is discussed on the background of recently published IPD metaanalyses from the InfuseTM spinal FDA trials.

Keywords Isthmic spondylolisthesis · Reduction · Fusion · Spinal arthrodesis · TLIF · Minimally invasive · MIS · MAS · BMP

The authors are to be congratulated on this Grand Rounds case that offers an excellent learning opportunity to those readers, who are considering to advance from more traditional surgical techniques to a less invasive approach when addressing isthmic spondylolistheses [1].

Both, the rationales for the chosen treatment strategy as well as the surgical technique that was employed are laid out clearly, in a well-referenced fashion and with adequate detail.

The latter is especially important, as it allows surgeons less experienced with such techniques to prepare themselves for employing MIS (or MAS, as the authors prefer to term it) techniques.

For surgeons who are already experienced with less invasive spinal surgery, this is a good opportunity to compare their own decision-making, technical tricks and preferences to those of experts in the field.

While the authors describe the usage of tubular retractors, instruments and screws by one specific manufacturer, it should be understood that several medical device companies offer surgical tools, retractors and implants that can be used for performing such procedures.

The authors also deserve credit for their very unbiased description of the advantages of minimally invasive spinal surgery and for their clear statement that the likelihood of a good clinical outcome should not be compromised for the sake of a flashier surgical technique.

Advantages during early recovery with MIS techniques have also been found with degenerative spondylolistheses and severe stenoses treated with decompression and TLIF

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[2] as well as for those treated with instrumented posterolateral fusion [3].

As of yet, the proven benefits of such minimally invasive strategies are almost exclusively short-term: less blood loss, less immediate postoperative pain (in most, but not all studies) and a shorter hospital stay, as long as the health care system offers incentives in that direction.

Studies on financial savings with minimally invasive spine surgery are primarily available for the US health care system with its high profit margins, and there, they generally conclude in favour of MIS procedures [4–6].

They do however become contradictory, once direct health care cost is calculated [4].

We should not mistake the absence of evidence for the evidence of absence, but I am quite certain, that upcoming studies will be similarly unable to demonstrate any substantial mid- or long-term benefit of MIS over traditional open surgery by means of the commonly employed clinical and radiological outcome parameters.

This assessment is supported by the developments with other procedures in musculoskeletal surgery that were supposed to be replaced by minimally invasive techniques, such as hip arthroplasty and rotator cuff repairs.

There is, however, one large-scale study that shows a significant difference in surgical site infections between MIS and open PLIF/TLIF fusions [7].

While this difference reaches 4.6 versus 7 % in double-level procedures, it remains very small with single level procedures (4.5 vs. 4.8 %).

So why do surgeons tend to prefer a more complex and more demanding minimally invasive approach despite the existing data that only show short-term advantages over traditional surgical techniques?

Obvious, but cynical arguments might be that MIS represents the next challenge, once standard techniques have been mastered or that MIS markets better than “open surgery”.

But as the authors correctly argue, a transmuscular posterolateral approach has several technical advantages, particularly with regards to optimal implant placement.

Especially with some muscle-strong and not-so-slim individuals, the soft tissue dissection and the retraction required with open surgery in order to obtain a good screw trajectory can be a very unenjoyable task.

And to be perfectly honest: it is simply not an appealing proposition to strip the filet off several lumbosacral segments and to inflict an ugly injury onto our patients in order to perform a very localized, very targeted procedure when there is an aesthetically much more pleasing and technically elegant way of achieving the same goal.

The drawbacks to minimally invasive procedures are typically a demanding learning curve and an increased radiation exposure to the surgical team and to the patient,

an important issue, which the authors briefly touch upon in their manuscript.

Radiation exposure is a very relevant issue for surgeons and significantly increased exposures have consistently been found when employing MIS techniques [8].

But there is one point of criticism that I need to make, even though it may not be completely fair more than 5 years after the fact.

Why did the authors see a need for the off-label use of BMP in a healthy, lightweight 24-year old female?

The “aggressive discectomy” plus the “circumferential release”, the cage plus morselized local bone graft and the L5 screws exchanged for thicker ones after the reduction procedure in order to optimise purchase should have been perfectly sufficient.

Granted, the radiographs with a wonderful fusion and with the hardware removed look very nice, but we all know that radiographs are not clinical results.

It may be coincidence, but after persistent criticism by independent researchers, Medtronic decided to release all source data from their spinal surgery trials with rhBMP-2 (InfuseTM in the US, InductOsTM in much of Europe) to independent researchers.

This enabled amongst other investigations the meta-analysis of individual-participant data (IPD).

The two research groups charged with this work very recently published their results and in conclusion came to the following assessments:

“At 24 months, rhBMP-2 increases fusion rates, reduces pain by a clinically insignificant amount, and increases early postsurgical pain compared with iliac crest bone graft. Evidence of increased cancer incidence is inconclusive” [9].

“In spinal fusion, rhBMP-2 has no proven clinical advantage over bone graft and may be associated with important harms, making it difficult to identify clear indications for rhBMP-2. Earlier disclosure of all relevant data would have better informed clinicians and the public than the initial published trial reports did” [10].

For us surgeons, this may serve as a reminder that not everything that can be done, must be done; especially, when it is industry-driven.

Conflict of interest None.

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