Minimally Invasive Spine Surgery in Korea

-Neurosurgery-Oriented View-

Chun-Kun Park MD PhD

Good Doctor Teun Teun Hospital, Anyang Korea
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Minimally invasive spine surgery (MISS) has been taken the lead by neurosurgery in Korea, unlike most of other countries, in which orthopedic surgery usually leads MISS. This is because neurosurgeon has been more familiar with microsurgery using an operating microscope, especially in brain surgery. Neurosurgeons in Korea have started microsurgery in almost all kinds of brain and spine surgeries since late 1970s\(^1\), and an article dealing with microscopic discectomy came out in 1982, perhaps firstly in Korea\(^2\). Taking into consideration of neurosurgeons’ predominance over orthopedic surgeons in microsurgery that time, no wonder that neurosurgeons have applied microsurgery in lumbar discectomy much earlier than orthopedic surgeons.

Various kinds of MISS apparatus have been launched in Korean market until now, which included IDET, laser discectomy, nucleotome, nucleoplasty, transforaminal endoscopic discectomy, microendoscopic discectomy and epiduroscopic apparatuses, etc. between early 1980s and early 2010s. One of characteristic points in Korea should be that MISS has been mainly driven not by faculties in university hospitals but by practicing spine surgeons. In early period, their MISS activities and practices had been considered a business activities and a sort of excess medical service to increase revenue by spine surgeons in university hospitals. However, in spite of such prejudice and misunderstanding, practicing spine surgeons have tried hard themselves to develop and improve MISS devices and surgical techniques. As a result, when it comes to MISS techniques and skills, Korean MISS surgeons are recognized as the best in the World in deed as well as in name these days.

Some practicing spine surgeons, who were interested in MISS had organized their own scientific community firstly late 1990s in Korea, named “Korean Society of Minimally Invasive Spine Surgery” (KOSMISS), in which practicing spine surgeons and private spine hospitals had taken the lead. However, most of spine surgeons working in university hospitals, who had had prejudice about their activities, considered this society as a sort of medium of public relations and a platform of profit creation for their own hospitals, and consequently most of professors didn’t join this society.
Meanwhile, some neurosurgery professors in university hospitals established another scientific community, “Korean Minimally Invasive Spine Surgery Society” (KOMISS) in 2002 as a counter part of KOSMISS and invited many practicing spine surgeons as an active member or Board member according to their career and expertise of MISS. The Author is a founder of the KOMISS and served as first president of this society. These two societies had competed each other for a while. Both societies had organized a cadaver hands-on workshop of MISS respectively once or twice a year for not only national but international physicians also since their establishments. However, KOMISS merged KOSMISS into a single society named KOMISS early this year. Nobody disagreed that KOMISS has made a great contribution toward development of MISS in Korea, while the role of KOSMISS and its founder “Wooridul Hospital” in making Korea MISS regarded as the best should not be neglected either.

If we have a look at the history of change of MISS in Korea, as I described earlier in this article, the beginning of MISS should be application of an operating microscope during lumbar and cervical discectomy by neurosurgeons in 1980s in Korea. The other MISS procedure in 1980s should be chemonucleolysis using ‘Chymopapain’ for lumbar disc herniation. Professor Kim should be credited with his contribution on the clinically vitalizing the chemonucleolysis in Korea4). The former procedure is still applied into clinical practice under the name of ‘microdiscectomy’ and recognized as a golden standard in surgical treatment of disc herniation5). However, the latter one was abandoned completely because of fatal hypersensitivity of chymopapaine in some patients.

Between 1990s and 2000s, various kinds of percutaneous intradiscal devices had been introduced as a tool mainly for intradiscal decompression, but most of them except for nucleoplasty and a few others, have been buried in oblivion until now, because of lack of evidence in therapeutic efficacy and/or doubts about their cost effectiveness.

With regard to endoscopic discectomy, when this procedure was introduced in Korea market, surgical techniques and devices appeared to be not enough to carry out a proper discectomy, and be considered as the same kind as intradiscal decompression, practically not a discectomy but an indirect procedure. Otherwise, two-channel endoscopic procedure using two portals could be a one of the available options for endoscopic discectomy, that time. However, the techniques and percutaneous endoscopy devices and tools using a single portal have been developed rapidly and nowadays a surgeon can not only do discectomy for protruded lumbar disc but remove extruded disc fragments also only using a single-portal endoscopic device and relevant surgical tools. In fact, Korean spine surgeons played a great role in this development, especially of surgical techniques6)7)8).

And a lot of scientific articles dealing with endoscopic procedures in the lumbar spine diseases
have come out, many of which were submitted by Korean surgeons, particularly by faculties in Wooridul Hospital\(^6\)\(^8\). Some of those articles revealed a high grade of evidence. Meanwhile some conservative groups including spine surgeons working for HIRA (Health Insurance Review & Assessment Services) are still skeptical about clinical relevancy of endoscopic discectomy, and disagree with MISS surgeons’ proposal to ease legal restriction. This restriction might be legislated to prohibit an overuse of endoscopic discectomy about 10 years ago when this procedure had only decompressive effects rather than discectomy in the management of lumbar disc herniation. Now, various technical and hard-ware oriented limitations of endoscopic discectomy have been significantly overcome by development of surgical techniques and skills, surgical devices and tools.

High technology and science have given a birth to various MISS devices currently, and these devices were introduced to Korea market. When a couple of representative devices, which came out several years ago and might be recognized their potentiality to become a device of the next generation, should be chosen, there might be SELD (trans-Sacral Endoscopic Laser Discectomy) and TELA (Transforaminal Epiduroscopic Laser Annuloplasty). These two devices have many similar functions between two but totally different original target organ and different access to the epidural space of the lumbar spine. The target and access are a herniated disc and the sacral hiatus in SELD, while the posterior part of the annulus and the intervertebral foramen respectively in TELA. The devices are an amalgam of the high technology and science: a less than 4-mm slim and steerable catheter equipped with video camera and laser systems. Especially, the SELD appeared to be promising. It can substitute significant part of role of microscopic discectomy, the golden standard of lumbar discectomy and be used to compensate for the blind area of transforaminal endoscopic discectomy such as removal of migrated disc fragments. Furthermore, SELD can be used for the function of annuloplasty as well, and to explore the epidural space in case of an unidentified back pain with a suspected lesion in image studies but not confirmative. This device still has a lot more potentiality to develop to the one to be applied for the management of more complicated and larger lesions in the future as long as the high technology and science allow to have more sophisticated equipped system and tools.

In addition to the science applied to these devices, laser technology, image technology and optical science, development of robotics and material and design engineering is expected to contribute to the future of MISS. Korean physicians should stand the pace of such scientific developments to maintain their reputation in MISS.

REFERENCES


