

Minimally Invasive Spine Surgery in Korea - A Neurosurgeon's View -

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In Korea, neurosurgery has taken the lead in minimally invasive spine surgery (MISS) since early 1980s, unlike most of other countries, in which orthopedic surgery usually leads MISS. Between 1990s and 2000s, surgical techniques and relevant equipments and tools of endoscopic discectomy have been rapidly developed and extended its surgical indications. In this development, KOMISS and its members, especially practicing physicians made a great contribution, especially in the field of endoscopic discectomy in Korea and in the world. High technology and science have given a birth to new MISS devices currently, and some of these devices such as epiduroscopic laser discectomy and annuloplasty technologies have been launched and used in Korea market. Other advanced technologies and engineering area also expected to contribute to the future of MISS. Korean spine surgeons should stand the pace of such scientific developments to maintain their reputation in MISS.

Key Words: MISS, Korea, Microscope, Endoscopic discectomy, Advanced science

INTRODUCTION

In Korea, neurosurgery has taken the lead in minimally invasive spine surgery (MISS), 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 1970s¹⁾, and an article dealing with microscopic discectomy came out in 1982, perhaps firstly in Korea²⁾. Taking into consideration of neurosurgeons' early application of surgical microscope in their surgeries, no wonder that neurosurgery has a predominance on orthopedic surgeons in MISS in Korea.

Various kinds of MISS device and technique 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 mainly practicing spine surgeons and private spine hospitals had taken the lead. However, most of spine surgeons working in university hospitals, who 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 college faculties 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 the founder of the KOMISS and served as the 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 foreign 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. Recently, KOMISS, born again by merging with KOSMISS, success-

fully organized the 5th World Congress of Minimally Invasive Spine Surgery & Techniques held in Jeju Island, Korea.

If we look back into the history 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 might be chemonucleolysis using 'Chymopapaine' for lumbar disc herniation. Professor Kim should be credited with his contribution on the clinically vitalizing the chemonucleolysis in Korea^{3,4}. However, while 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, 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, practically not as a discectomy but as an indirect decompression. 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 techniques⁶⁻⁸.

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 Wooidul 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, skills, devices and various tools.

High technology and science have given a birth to various MISS devices currently, and they were introduced to Korea market. Among these MISS devices, two representative ones, which came out several years ago and could be recognized to have a poten-

tiality to become a device of the next generation, are selected: the one is SELD (trans-Sacral Endoscopic Laser Discectomy), the other TELA (Transforaminal Epiduroscopic Laser Annuloplasty). These two devices have many similarities in the basic functions between two, but each has totally different designated target in 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 the 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 far 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 but not confirmative in image studies. This device still has a lot more potentiality to develop to a more serviceable device, which can 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 sophisticatedly equipped system and tools.

In future perspectives, diverse fields of science such as laser and image technology and optical science, development of robotics and material and design engineering are 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

1. Kim HJ, Lee KC, Kim SC, Lee HJ: Microsurgical treatment of cerebral arteriovenous malformation. *J Korean Neurosurg Soc* 5: 59-68, 1976
2. Kim YS, Lee KC: Microsurgical operation of herniated lumbar disc. *J Korean Neurosurg Soc* 11:515-521, 1982
3. Park KH, Choi JS, Park WY, et al: Therapeutic results in patients with herniated lumbar discs herniation. *J Korean Neurosurg Soc* 15:567-572, 1986
4. Park KW, Kim YS: A clinical study of chemonucleolysis for herniated lumbar discs. *J Korean Neurosurg Soc* 15:573-586, 1986
5. Park CK: Microsurgery for lumbar disc disease. *J Korean Neurosurg Soc* 23:1012-1018, 1994
6. Kim JS, Choi G, Lee SH: Percutaneous endoscopic lumbar discectomy via contralateral approach: a technical case report. *Spine* 36:E1173-1178, 2011
7. Hur JW, Kim JS, Shin MH, Ryu KS, Park CK, Lee SH: Percutaneous endoscopic discectomy and annuloplasty for lumbar disc herniation at the low two contiguous levels. *J Neurol Surg A Cent Eur Neurosurg* 75:381-385, 2014
8. Choi G, Kim JS, Lokhande P, Lee SH: percutaneous endoscopic lumbar discectomy by transiliac approach. *Spine* 34:E443-446, 2009