The Efficacy to Delay the Surgical Need by Transcaudal Epidural Steroid Injection in Degenerative Lumbar Spinal Stenosis with and without Listhesis: 7-Year Retrospective Study

Chaisiri Chaichankul MD*, Chaiyos Chaichankul MD**,
Pheeraphan Srisook MD*, Nantawat Uttamo MD*

* Department of Orthopaedics, Phramongkutklao Hospital and College of Medicine, Bangkok, Thailand
** Department of Orthopaedics, Veterans General Hospital, Bangkok, Thailand

Background: *Currently, epidural steroid injection (ESI) is considered as one of conservative treatments for degenerative lumbar spondylosis. Transcaudal epidural steroid injection (CESI), which is one of ESI techniques, has a lot of evidence to support the treatment of chronic low back pain with or without radiculopathy, both for short- and long-term. Presently, there are few studies about the efficacy of CESI to delay the surgical need in degenerative lumbar spinal stenosis (DLSS) with or without listhesis.*

Objective: *To demonstrate and compare the efficacy of CESI in treating DLSS with and without listhesis.*

Material and Method: *The present retrospective study analyzed the patients treated by CESI between June 2008 and May 2015 in a single institute. The medical records of the patients diagnosed as DLSS with and without listhesis were reviewed. The demographic data and the end result demonstrating as surgical need of the enrolled patients were collected and analyzed by using one-way ANOVA and Fisher's exact test. Chi-square test and Mann-Whitney U test were used to evaluate and compare age, sex, rate of operation, and the time period to operate after the last CESI was performed, between the two groups of patients.*

Results: *Seven hundred forty six CESIs had been performed between June 2008 and May 2015. Six hundred fifty five CESIs were performed in 414 patients of DLSS with and without listhesis, whereas 91 CESIs were performed in 75 patients of other diagnoses. Three hundred seventy two CESIs were done in 268 cases of DLSS without listhesis (120 males, 148 females, median age = 64 years) and 283 CESIs were done in 146 cases of DLSS with listhesis (36 males, 110 females, median age = 66 years). The data demonstrated that the patients diagnosed as DLSS with listhesis had a statistically significant tendency to occur in female than the patients of DLSS without listhesis ($p<0.001$). Seventeen cases of DLSS without listhesis (17/268, 6.34%) and 30 cases of DLSS with listhesis ended in an operation (30/146, 20.55%), during the seven years study. Rate of operation in DLSS with listhesis after CESI was more statistically significant than in those DLSS without listhesis ($p<0.001$).*

Conclusion: *CESI is an effective conservative treatment for DLSS with and without listhesis. The present study demonstrated that CESI statistically significant delayed the time of operation and reduced the surgical need in patients diagnosed as DLSS without listhesis when compared to patients with listhesis over a period of seven years.*

Keywords: *Degenerative lumbar spinal stenosis, Degenerative lumbar spondylolisthesis, Transcaudal technique, Epidural steroid injection, Surgical need, Efficacy*

J Med Assoc Thai 2017; 100 (9): 990-6
Website: http://www.jmatonline.com

Degenerative lumbar spondylosis is a common back problem affecting the aging population. While the degenerative process progresses, a stepwise cascade of degeneration will emerge from disk degeneration, narrowing of intervertebral disk space, buckling of the ligamentum flavum, and then followed by hypertrophy of ligamentous and facet joints, leading to various signs and symptoms of degenerative lumbar spondylosis[1,2]. Although most of lumbar spondylotic patients are asymptomatic[3], some of them can present as a spectrum of signs and symptoms of stenosis and/or listhesis. The clinical presentation of symptomatic degenerative lumbar spinal stenosis (DLSS) without listhesis is quite similar to with listhesis. The listhesis that concomitantly occurs in the spinal degenerative process may further exacerbate the stenosis and instability[5,6].

Correspondence to:
Chaichankul C; Department of Orthopaedics, Phramongkutklao Hospital and College of Medicine, Bangkok 10400, Thailand.
Phone: +66-89-2029510
E-mail: chaichankulc@yahoo.com

Although there are variety of options, there is still no definite guideline of treatment in degenerative lumbar spondylosis. The treatment goal is to relieve pain and improve physical functioning especially for daily living activities. Currently, epidural steroid injection (ESI) is considered as one of conservative treatments in degenerative diseases, notably in spondylosis[7]. One of ESI techniques is the transcaudal epidural steroid injection (CESI). It has a lot of evidence to support the treatment for chronic low back pain with or without radiculopathy both in short- and long-term[7-11]. The present study intends to demonstrate and compare the efficacy of CESI in treating DLSS with and without listhesis by showing the end result as surgical need in a 7-year retrospective study.

Material and Method

Medical records of patients that received CESIs in a single institute (Phramongkutklao Hospital, Bangkok, Thailand) between 2008 and 2015 were reviewed by a junior author (Srisook P). Of those treated by CESIs, the author included only patients diagnosed as DLSS with and without listhesis, and excluded those with other diagnoses. The present study defined listhesis or dynamic instability when standing lateral flexion and extension radiographs demonstrated more than 3 mm of anterior translation of the superior vertebral body on the inferior body or the angular motion beyond 10 degrees[6]. The demographic data, the end result in term of the surgical need, and the time period between treating with CESI and operative surgery, as well as the indications to refer the enrolled patients to surgery were collected and analyzed by a junior author (Uttamo N).

CESI technique

The CESI procedures were performed by a senior author (Chaichankul C). All CESIs were performed by using Tuohy epidural needle No. 16 with catheter for delivery the composite of injectates to the pathological sites. The composite of injectates were the combination of 80 mg of methylprednisolone, 2 mL of 0.5% bupivacain, and 6 mL of normal saline. The accuracy of all CESIs was enhanced by using fluoroscopic guidance combined with contrast media (IOPAMIRO® 300).

Outcome assessment

Demographic data including age, sex, and the number of the surgical need of the enrolled patients were analyzed by using one-way ANOVA and Fisher's exact test. Chi-square test and Mann-Whitney U test were used to evaluated and compared about age, sex, rate of operation, and the time period to operate after performed the last CESI between two groups of patients. SPSS 17.0 statistic software (SPSS Inc., Chicago) was used for all statistical analyzes in this study.

Indication for surgery

All enrolled patients diagnosed as DLSS with or without listhesis were initially treated by conservative treatments including medication, physical therapy, and lifestyle modification for at least four to six weeks. If the back and leg visual analog scores were not improved by more than 50%, they were enrolled to receive CESI. In the present study, the authors terminated the role of conservative treatments, including CESI, in patients having intractable back or leg pain (in case of the back and leg visual analog score not improving by more than 50% after 12 weeks follow-up period), progressive neurological deficits, and cauda quina syndrome.

Results

Between June 2008 and May 2015, 746 CESIs were performed in Phramongkutklao Hospital, Bangkok, Thailand. After analyzed, the authors found that 655 CESIs were performed in 414 cases of both DLSS with and without listhesis, while 91 CESIs were performed in75 patients with the other diagnoses. Of the 655 CESIs, 372 CESIs were performed in 268 patients of DLSS without listhesis (120 males, 148 females, median age = 64 years, mean 1.39 times/patient) and 283 CESIs were performed in 146 patients of DLSS with listhesis (36 males, 110 females, median age = 66 years, mean 1.93 times/patient) (Fig. 1). Although the age shown in the present study of both groups was not statistically significant different (p = 0.162), the patients diagnosed as DLSS with listhesis had a statistically significant tendency to occur in female gender than the patients diagnosed as DLSS without listhesis (female: male = 3.05:1 and 1.23:1, respectively), (p<0.001) (Fig. 2). Furthermore, the present study showed that the number of CESI in cases of DLSS with listhesis was more than in the cases of DLSS without listhesis (1.93 and 1.39 times, respectively).

This study showed that surgery was required in 17 cases of DLSS without listhesis (6.34%) and 30 cases of DLSS with listhesis (20.55%) during the seven years period (Fig. 3). The authors found that a statistically significant greater rate of operation after

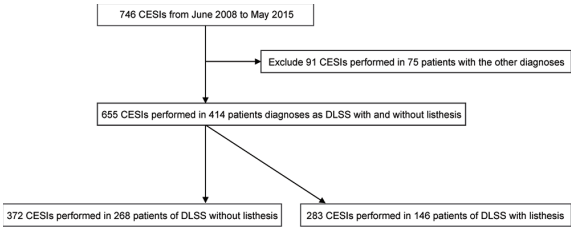

Fig. 1 Flowchart demonstrating the medical record review of CESIs performed in patients diagnosed as DLSS with and without.

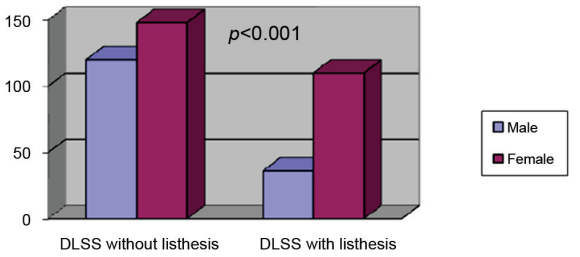

Fig. 2 Gender characteristic of patients diagnosed as DLSS with and without listhesis.

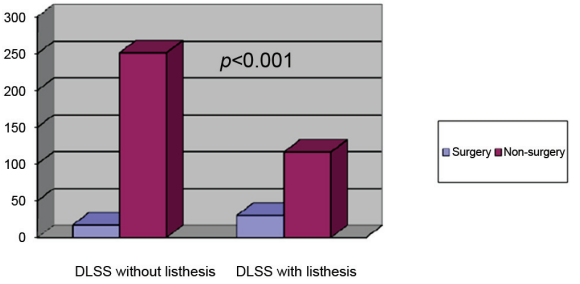

Fig. 3 Graph showing the proportion of surgery versus non-surgery in patients diagnosed as DLSS with and without listhetic.

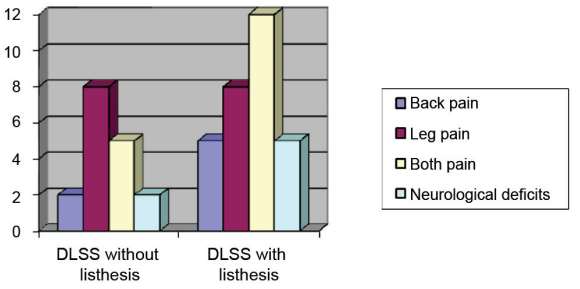

Fig. 4 Graph showing and comparing the indications to surgery between patients diagnosed as DLSS with and without listhesis.

CESI in the cases of DLSS with listhesis than in the cases of DLSS without listhesis (p<0.001). However, when comparing the median time period of the surgical operation after the last performed ESI between both groups, there was no statistically significant difference (p = 0.781). In the group of DLSS without listhesis, 15 cases (15/17, 88.24%) were operated on because of pain, whereas the other two cases (2/17, 11.76%) were because of progressive neurological deficits. Similarity, the surgical indication as pain were recorded in 25 cases (25/30, 83.34%) and as neurological deficits in five cases (5/30, 16.67%) in the group of DLSS with listhesis (Fig. 4).

Discussion

Although there have been many controversial treatments in treating DLSS, the goal of the treatment is to improve quality of life by reducing pain and maintaining and restoring neurological function. While results of surgery are favorable with high-quality evidence supporting surgical management[12], the surgery is still considered as the last resort for treating DLSS in most practice[4,5]. Surgical treatment is commonly prescribed to patients, with intractable pain, progressive neurological deficits, and not responding to conservative treatment leading to significant reduction in the functional status. Although many studies reported about the effectiveness of ESIs for treating DLSS, in both short- and long-term[9,13,14], no articles according to the authors' current knowledge demonstrated the efficacy and comparing effect of CESI in treating between DLSS with and without listhesis in term of surgical need.

ESI is considered as one modality that plays a role in conservative treatment of lumbar spondylosis[15]. Historically, these injections, which have been recommended by several authorities as important component for conservative management of radicular pain from spinal disorders, have been used for both axial and radicular pain for more than five decades[16]. There are three common techniques described in ESI as transcaudal, interlaminar, and transforaminal techniques. The authors selected CESI with fluoroscopic guidance as the technique of choice because of several advantages. First, CESI is quite an easy procedure when compared to other techniques. The sacral hiatus, where is the entry point of Tuohy needle, is able to palpate in most patients. Palpation of the sacral cornua and thus, the hiatus makes it possible to insert a needle without fluoroscopic guidance[17]. However, without imaging guidance, the failure rate was reported as high as 25%, even by skilled anesthesiologists[18]. To reduce the failure rate, fluoroscopic guidance was used in the present study[19]. Second, CESI has fewer serious complications when compared to other techniques

(interlaminar and transforaminal), which have been linked to catastrophic complications[20-22]. Third, a comparable effectiveness of CESI was reported when compared to other techniques[23].

From our data, it was revealed that the group of patients diagnosed as DLSS with listhesis had tendency to receive a higher number of CESI during the 7-year study when compared to the patients without (1.93 times versus 1.39 times, respectively). This data may infer that patients with DLSS associated with listhesis could have more severe symptoms, especially from radicular pain and neurogenic claudication caused by dynamic translation that irritates the exiting and traversing nerve roots[5,24]. Interestingly, there are statistically significantly more patients in the group of DLSS with listhesis that underwent operation than in the group of DLSS without listhesis. Only 11.35% (47/414 cases) of the patients in both groups that needed the surgery at the end of the study. Consequently, it means that CESIs, as the adjuvant conservative treatment, can delay the surgical need in nearly 90% in a 7-year period. A previous literature reviewed by Watters et al concluded that rapid or catastrophic neurologic decline was rare in DLSS, especially in mild or moderate degree of canal compromise[25]. It is unclear which factors account for patients who become significantly symptomatic from lumbar spondylosis. Pain, which includes back and leg pain, is the major indication that referred patients to operate in our study.

ESIs have been used for decades for the treatment of discogenic and radicular pain. Botwin et al reported significant improvement in pain and walking tolerance at 1-year among patients treated with ESIs[26]. A retrospective study by Delport et al also reported that treating with either transforminal or caudal ESI could relieve pain and improve functional status of patients with DLSS[27]. The mechanisms of steroid to relieve pain in DLSS with or without listhesis have been proposed by two mechanisms as inflammatory and analgesic theory[28]. The inflammatory mediators such as phospholipase A2, which is found in high concentrations in the human intervertebral disc, may play a major role in many involved pathological back and radicular pain[29]. The mechanisms of epidural steroid inhibit the inflammatory cascade, which can reduce and maintain symptoms in groups of these patients. The steroid may have a direct nociceptive action as it is proposed as a blockade of nociceptive C-fiber conduction[30,31]. The polyethylene glycol and benzyl alcohol that is contained in the steroid preparation itself can also cause chemical blockade or destruction of C-fiber axons and nerve terminals[29]. In addition, by using CESI, we can also offer the large volume of injectate, which has the osmotic dilution effect of epidural inflammatory mediators[32].

Because this is a retrospective study, there are several limitations. The authors were unable to control many important factors that influenced the outcomes i.e., the degree of disease severity classified by symptoms or imaging studies, or the other kinds of conservative treatment that the enrolled patients received during the period of study[32]. In addition, we realized that the need for activity of daily living in patients was individual. Therefore, the equal severity of disease may not reflect the same treatment option. Furthermore, the threshold of the surgeon (CC) to refer the individual patient to the surgical operation is not valid. However, from the information of our study, even as a retrospective study, it demonstrated an optimistic insight of CESI for management of degenerative spinal pathology.

Conclusion

Although there is no consensus of the optimal options for the treatment of DLSS with and without listhesis, CESI seemed to be one of the effective conservative treatments. Interestingly, the study demonstrated that CESI has an efficacy to statistically significantly delay the time of operation and reduce the surgical need in the patients diagnosed as DLSS without listhesis when compared to the patients with listhesis during the 7-year study.

What is already known on this topic?

There are variety of options, but still no definite guideline of treatment in degenerative lumbar spondylosis. The goal of the treatment is to relieve pain and improve physical functioning especially for daily living activities. Currently ESI is considered as one of conservative treatments for degenerative lumbar spondylosis. CESI, which is one of ESI techniques, is proven to support the treatment of chronic low back pain with or without radiculitis both in short- and long-term.

What this study adds?

Although there is no consensus of the optimal option for the treatment of DLSS with and without listhesis, CESI is deemed as one of the effective conservative treatments. Interestingly, the present study demonstrated that CESI has an efficacy to delay the time of operation and reduce the surgical need in the patients diagnosed as DLSS without listhesis

statistically significant when compared to the patients with listhesis during the 7-year study.

Potential conflicts of interest

None.

References

1. Majid K, Fischgrund JS. Degenerative lumbar spondylolisthesis: trends in management. J Am Acad Orthop Surg 2008; 16: 208-15.
2. Wilby MJ, Fraser RD, Vernon-Roberts B, Moore RJ. The prevalence and pathogenesis of synovial cysts within the ligamentum flavum in patients with lumbar spinal stenosis and radiculopathy. Spine (Phila Pa 1976) 2009; 34: 2518-24.
3. Johnsson KE, Rosen I, Uden A. The natural course of lumbar spinal stenosis. Clin Orthop Relat Res 1992; (23): 82-6.
4. Herkowitz HN, Kurz LT. Degenerative lumbar spondylolisthesis with spinal stenosis. A prospective study comparing decompression with decompression and intertransverse process arthrodesis. J Bone Joint Surg Am 1991; 73: 802-8.
5. Lee JYB, Patel AA. Lumbar spinal stenosis and degenerative spondylolisthesis. Semin Spine Surg 2013; 25: 256-62.
6. Frymoyer JW, Selby DK. Segmental instability. Rationale for treatment. Spine (Phila Pa 1976) 1985; 10: 280-6.
7. Gharibo C, Koo C, Chung J, Moroz A. Epidural steroid injections: An update on mechanisms of injury and safety. Tech Reg Anesth Pain Manag 2009; 13: 266-71.
8. Berg AO, Allan JD. Introducing the third US Preventive Services Task Force. Am J Prev Med 2001; 20: 3-4.
9. Botwin K, Brown LA, Fishman M, Rao S. Fluoroscopically guided caudal epidural steroid injections in degenerative lumbar spine stenosis. Pain Physician 2007; 10: 547-58.
10. Huntoon MA, Burgher AH. Back to the future: the end of the steroid century? Pain Physician 2008; 11: 713-6.
11. Abdi S, Datta S, Trescot AM, Schultz DM, Adlaka R, Atluri SL, et al. Epidural steroids in the management of chronic spinal pain: a systematic review. Pain Physician 2007; 10: 185-212.
12. Weinstein JN, Tosteson TD, Lurie JD, Tosteson A, Blood E, Herkowitz H, et al. Surgical versus nonoperative treatment for lumbar spinal stenosis four-year results of the Spine Patient Outcomes Research Trial. Spine (Phila Pa 1976) 2010; 35: 1329-38.
13. Sayegh FE, Kenanidis EI, Papavasiliou KA, Potoupnis ME, Kirkos JM, Kapetanos GA. Efficacy of steroid and nonsteroid caudal epidural injections for low back pain and sciatica: a prospective, randomized, double-blind clinical trial. Spine (Phila Pa 1976) 2009; 34: 1441-7.
14. Koc Z, Ozcakir S, Sivrioglu K, Gurbet A, Kucukoglu S. Effectiveness of physical therapy and epidural steroid injections in lumbar spinal stenosis. Spine (Phila Pa 1976) 2009; 34: 985-9.
15. Doshi PP, Makwana JD. Practice of epidural steroid injections outside of the United States. Tech Reg Anesth Pain Manag 2009; 13: 258-65.
16. Deer T, Ranson M, Kapural L, Diwan SA. Guidelines for the proper use of epidural steroid injections for the chronic pain patient. Tech Reg Anesth Pain Manag 2009; 13: 288-95.
17. Patel VB. Techniques for epidural injections. Tech Reg Anesth Pain Manag 2009; 13: 217-28.
18. White AH. Injection techniques for the diagnosis and treatment of low back pain. Orthop Clin North Am 1983; 14: 553-67.
19. el Khoury GY, Ehara S, Weinstein JN, Montgomery WJ, Kathol MH. Epidural steroid injection: a procedure ideally performed with fluoroscopic control. Radiology 1988; 168: 554-7.
20. Houten JK, Errico TJ. Paraplegia after lumbosacral nerve root block: report of three cases. Spine J 2002; 2: 70-5.
21. Huntoon MA, Martin DP. Paralysis after transforaminal epidural injection and previous spinal surgery. Reg Anesth Pain Med 2004; 29: 494-5.
22. Botwin KP, Castellanos R, Rao S, Hanna AF, Torres-Ramos FM, Gruber RD, et al. Complications of fluoroscopically guided interlaminar cervical epidural injections. Arch Phys Med Rehabil 2003; 84: 627-33.
23. Mendoza-Lattes S, Weiss A, Found E, Zimmerman B, Gao Y. Comparable effectiveness of caudal vs. trans-foraminal epidural steroid injections. Iowa Orthop J 2009; 29: 91-6.
24. Newman PH, Stone KH. The etiology of spondylolisthesis. J Bone Joint Surg 1963; 45B: 39-59.
25. Watters WC 3rd, Baisden J, Gilbert TJ, Kreiner S, Resnick DK, Bono CM, et al. Degenerative lumbar spinal stenosis: an evidence-based clinical

guideline for the diagnosis and treatment of degenerative lumbar spinal stenosis. Spine J 2008; 8: 305-10.
26. Botwin KP, Gruber RD, Bouchlas CG, Torres-Ramos FM, Sanelli JT, Freeman ED, et al. Fluoroscopically guided lumbar transformational epidural steroid injections in degenerative lumbar stenosis: an outcome study. Am J Phys Med Rehabil 2002; 81: 898-905.
27. Delport EG, Cucuzzella AR, Marley JK, Pruitt CM, Fisher JR. Treatment of lumbar spinal stenosis with epidural steroid injections: a retrospective outcome study. Arch Phys Med Rehabil 2004; 85: 479-84.
28. Baqai A, Bal R. The mechanism of action and side effects of epidural steroids. Tech Reg Anesth Pain Manag 2009; 13: 205-11.
29. Manchikanti L. Pharmacology of neuraxial steroids. In: Manchikanti L, Singh V, editors. Interventional techniques in chronic spinal pain. Paducah, KY: ASIPP Publishing; 2007: 167-84.
30. Mulleman D, Mammou S, Griffoul I, Watier H, Goupille P. Pathophysiology of disk-related sciatica. I.--Evidence supporting a chemical component. Joint Bone Spine 2006; 73: 151-8.
31. Johansson A, Hao J, Sjolund B. Local corticosteroid application blocks transmission in normal nociceptive C-fibres. Acta Anaesthesiol Scand 1990; 34: 335-8.
32. Ericksen S. Lumbar spinal stenosis: Imaging and non-operative management. Semin Spine Surg 2013; 25: 234-45.

ประสิทธิภาพในการรักษาของการฉีดยาสเตียรอยด์เข้าโพรงกระดูกสันหลังระดับเอวผ่านทางช่องกระดูกสันหลังส่วนปลายเพื่อหลีกเลี่ยงการผ่าตัดในภาวะหมอนรองกระดูกสันหลังระดับเอวเสื่อมที่มีหรือไม่มีการเคลื่อนของกระดูกสันหลัง ในระยะเวลา 7 ปี

ชัยศิริ ชัยชาญกุล, ไชยยศ ชัยชาญกุล, พีระพรรณ ศรีสุข, นันทวัฒน์ อุตตโม

ภูมิหลัง: *การรักษาด้วยการฉีดยาสเตียรอยด์เข้าช่องโพรงกระดูกสันหลังจัดเป็นการรักษาแบบอนุรักษ์สำหรับอาการที่เกิดจากภาวะหมอนรองกระดูกสันหลังเสื่อมได้ดีวิธีหนึ่ง โดยในปัจจุบันวิธีการฉีดยาดังกล่าวเข้าช่องส่วนปลายของกระดูกสันหลังเป็นหนึ่งในหลายวิธีที่มีการศึกษาสนับสนุนว่าได้ผลดีทั้งในระยะสั้นและยาวสำหรับการรักษาอาการปวดหลังเรื้อรังที่มีหรือไม่มีการอักเสบของเส้นประสาทส่วนปลายร่วมด้วย*

วัตถุประสงค์: *แสดงถึงประสิทธิภาพและเปรียบเทียบผลการรักษาด้วยวิธีดังกล่าวเพื่อหลีกเลี่ยงการผ่าตัดในภาวะหมอนรองกระดูกสันหลังระดับเอวเสื่อมที่มีการเคลื่อนของกระดูกสันหลังร่วมด้วย เปรียบเทียบกับภาวะหมอนรองกระดูกสันหลังระดับเอวเสื่อมแต่ไม่มีการเคลื่อนของกระดูกสันหลัง ในระยะเวลา 7 ปี*

วัสดุและวิธีการ: *เป็นการศึกษาย้อนหลังโดยการเก็บรวบรวมข้อมูลจากประวัติการรักษาของผู้ป่วยที่ได้รับการวินิจฉัยว่าเป็นหมอนรองกระดูกสันหลังระดับเอวเสื่อมที่มีหรือไม่มีการเคลื่อนของกระดูกสันหลัง และได้รับการฉีดยาสเตียรอยด์เข้าช่องโพรงกระดูกสันหลังระดับเอวผ่านทางช่องกระดูกสันหลังส่วนปลาย ที่โรงพยาบาลพระมงกุฎเกล้า ระหว่างเดือนมิถุนายน พ.ศ. 2551 ถึง พฤษภาคม พ.ศ. 2558 โดยผู้นิพนธ์ได้รวบรวมและวิเคราะห์ข้อมูลพื้นฐานและผลลัพธ์จากการรักษาด้วยวิธีดังกล่าว โดยเปรียบเทียบระหว่างกลุ่มผู้ป่วยที่มีภาวะหมอนรองกระดูกสันหลังระดับเอวเสื่อมที่มีการเคลื่อนของกระดูกสันหลังร่วมด้วย เปรียบเทียบกับกลุ่มที่มีภาวะหมอนรองกระดูกสันหลังระดับเอวเสื่อมแต่ไม่มีการเคลื่อนของกระดูกสันหลัง*

ผลการศึกษา: *ตั้งแต่เดือนมิถุนายน พ.ศ. 2551 ถึง พฤษภาคม พ.ศ. 2558 พบว่ามีผู้ป่วยที่ได้รับการรักษาด้วยวิธีฉีดยาสเตียรอยด์เข้าช่องโพรงกระดูกสันหลังระดับเอวผ่านทางช่องกระดูกสันหลังส่วนปลายเป็นจำนวนทั้งสิ้น 746 ครั้ง โดยจำนวน 655 ครั้ง ทำในผู้ป่วยที่ได้รับการวินิจฉัยว่าเป็นหมอนรองกระดูกสันหลังระดับเอวเสื่อมที่มีหรือไม่มีการเคลื่อนของกระดูกสันหลัง และ 91 ครั้ง ทำในผู้ป่วยที่ได้รับการวินิจฉัยในภาวะอื่น ขณะที่ 372 ครั้ง ทำในผู้ป่วยที่มีภาวะหมอนรองกระดูกสันหลังระดับเอวเสื่อมที่มีการเคลื่อนของกระดูกสันหลัง 268 ราย และ 283 ครั้ง ทำในผู้ป่วยที่มีภาวะหมอนรองกระดูกสันหลังระดับเอวเสื่อมที่ไม่มีการเคลื่อนของกระดูกสันหลัง 146 ราย ในระยะเวลา 7 ปี ของการศึกษา พบว่า 6.34% ของผู้ป่วยที่ได้รับการวินิจฉัยว่าเป็นหมอนรองกระดูกสันหลังระดับเอวเสื่อมที่มีการเคลื่อนของกระดูกสันหลัง และ 20.55% ของผู้ป่วยที่ได้รับการวินิจฉัยว่าเป็นหมอนรองกระดูกสันหลังระดับเอวเสื่อมที่ไม่มีการเคลื่อนของกระดูกสันหลังจะได้รับการผ่าตัด โดยพบว่าอัตราการผ่าตัดจะพบในกลุ่มผู้ป่วยที่ได้รับการวินิจฉัยว่าเป็นหมอนรองกระดูกสันหลังระดับเอวเสื่อมที่มีการเคลื่อนของกระดูกสันหลังมากกว่าในกลุ่มผู้ป่วยที่ได้รับการวินิจฉัยว่าเป็นหมอนรองกระดูกสันหลังระดับเอวเสื่อมแต่ไม่มีการเคลื่อนของกระดูกสันหลังอย่างมีนัยสำคัญ*

สรุป: *การรักษาด้วยวิธีฉีดยาสเตียรอยด์เข้าช่องโพรงกระดูกสันหลังระดับเอวผ่านทางช่องกระดูกสันหลังส่วนปลายถือว่าเป็นการรักษาแบบอนุรักษ์ที่มีประสิทธิภาพอีกวิธีหนึ่งในผู้ป่วยที่มีอาการเกิดจากภาวะหมอนรองกระดูกสันหลังเสื่อมที่มีหรือไม่มีการเคลื่อนของกระดูกสันหลังร่วมด้วย และพบว่าการรักษาด้วยวิธีดังกล่าวสามารถลดและชะลอเวลาของการผ่าตัดได้ โดยสามารถลดและชะลอการผ่าตัดในผู้ป่วยกลุ่มที่มีอาการเกิดจากภาวะหมอนรองกระดูกสันหลังเสื่อมที่มีการเคลื่อนของกระดูกสันหลังได้มากกว่ากลุ่มที่ไม่มีการเคลื่อนของกระดูกสันหลังอย่างมีนัยสำคัญ*