



Original Article (SPINE)

Frequency of Incidental Durotomy during Surgery for Degenerative Lumbar Spine Disease

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ABSTRACT

Objective: One of the most common treatments performed in a neurosurgical facility for lower back pain and claudication is degenerative lumbar spine surgery. The study aimed to determine the frequency of incidental durotomy during surgery for degenerative lumbar spine diseases.

Materials and Methods: In this study, a total of 95 patients were included from the Department of Neurosurgery, Ayub Teaching Hospital, Abbottabad. After the patient's selection, their history, examination, and investigations, surgery was carried out by consultant neurosurgeons. Per-operatively unintentional dural tears were identified as rent in dura with or without CSF leak and were either repaired primarily or by applying fibrin glue if the repair was not possible.

Results: The mean age was 38 ± 12.62 years. Fifty-eight percent of patients were male and 42% of patients were females. More than 6% of patients had incidental durotomy while 94% of patients didn't have incidental durotomy. Recurrent disc prolapse was found in 5% of the cases. One percent of incidental durotomy patients were also recurrent instances, accounting for 6% of the total. Whereas 95% of patients did not require a durotomy, the surgery went smoothly.

Conclusion: The frequency of incidental durotomy was 6% during surgery for degenerative lumbar spine diseases.

Keywords: Incidental durotomy, Degenerative Lumbar Spine, Spinal Stenosis, Spinal Surgery.

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INTRODUCTION

Degenerative lumbar spine surgery is one of the most common procedures performed in a neurosurgical unit for lower backache and claudication. Degenerative lumbar spine disease includes prolapsed intervertebral disc, spondylolisthesis, and hypertrophy of the

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ligaments resulting in canal stenosis and producing various motor and sensory symptoms. The results of this study can add to the existing body of knowledge that will be used by local practitioners to treat the patients as well as provide references in the research field. Many individuals with lower back pain and claudication seek relief from their problems via lumbar degenerative surgery, which has shown to be an effective surgical solution for many.¹ Lumbar ligament hypertrophy, intervertebral disc prolapses, and spondylolisthesis all point to degenerative lumbar spine disease.² Risks associated with surgery for degenerative lumbar spine illness include CSF leakage and nerve root injury as well as surgeries performed at the wrong spinal level.³ Patients having disc surgery for a herniated or degenerative disc must have the capacity to heal dura-mater damage as soon as possible.⁴ The frequency of durotomy after degenerative lumbar spine surgery may vary, depending on the spinal pathology. Moreover, one-fourth of all spinal operations require a durotomy; however, the precise number varies greatly depending on the kind and intricacy of the therapy.⁵ When choosing a surgery, it is important to take into account factors such as the patient's age, gender, and the surgeon's experience.

A CSF fistula, osteodiscitis, and higher medical costs may all occur from a dural injury. To avoid problems, it is critical to identify and handle these implications as soon as possible. As the length of surgery grows, so does the danger of infection and meningitis.⁶ Idiopathic meningitis is characterized by low-pressure headaches, cutaneous CSF fistulas, and pseudomeningocele. There have been a few lawsuits filed against spine surgeons since it has been difficult to identify the patients.⁷ To treat durotomies, the American Academy of Orthopedic Surgeons recommends utilizing a standard surgical method and treatment plan. An increasing number of revision procedures are being necessitated by epidural

adhesions and surgical scars on the dura. In addition to physically incorrect screw placement, high traction on severely damaged discs may cause a tear of the dura.⁸ Many people are worried about the long-term effects of successfully treating an inflamed dural sleeve with a suitable treatment after it has worked.

According to our knowledge, no long-term studies have been done on decompression surgery and fusion surgery (DLSS). Degenerative lumbar spine disease surgery in Pakistan has not been adequately studied or recorded in the literature. We were curious as to how often these occur in Pakistan. In addition to those who practice medicine in the community, scholars in the field of research might benefit from this study's results.

MATERIALS AND METHODS

Study Design and Setting

A cross-sectional study was conducted for 6 months (22-2-2019 to 22-8-2019) at the Department of Neurosurgery, Ayub Teaching Hospital, Abbottabad.

Inclusion Criteria

Patients of both genders between 20-65 years of age were included.

Exclusion Criteria

Spinal tumors and infective lesions were excluded.

Data Collection

The hospital's ethical review board gave the project the light, and it is already underway. A consent form has been completed and submitted before any data gathering (of selected patients as per inclusion criteria). When the patient has provided full, informed, and voluntary consent, the only option to continue is to do so

immediately. All of the information was acquired by the investigator on his own time.

In this study, a total of 95 patients were included. After the patient's selection, their history, examination, investigations, and surgery were carried out by consultant neurosurgeons. Per-operatively unintentional dural tears were identified as rent in dura with or without CSF leak and were either repaired primarily or by applying fibrin glue if the repair was not possible.

It was a team of neurosurgeons who assessed, tested, and operated on the patient during the procedure. Accidental dural tears were treated with fibrin glue or healing therapy, depending on whether or not the rips could be stitched back together. The statistical analysis was performed using SPSS version 25.0. The mean and standard deviation let us determine the ages of the individuals. There were several parameters, such as durotomy, that were analyzed using frequency and percentage estimations.

RESULTS

Age and Gender Information

In this study mean age was 38 ± 12.62 years. Fifty-eight percent of patients were male and 42% of patients were females.

Prevalence of Incidental Durotomy

More than 6% of patients had incidental durotomy while 94% of patients didn't have incidental durotomy. Recurrent disc prolapse was found in 5% of the cases. A total of 6% of the 95 patients experienced an inadvertent durotomy, which was corrected. 2% of dura rent could not be repaired due to rent near to the dural sleeve or far lateral locations. Out of 6% of patients, incidental durotomy patients, 1% were recurrent cases as well. Whereas, 95% of patients did not have a durotomy and surgery went uneventful.

DISCUSSION

Surgeons at neurosurgical institutions may be able to alleviate lower back discomfort and claudication in patients with degenerative lower spine illness.⁹ Anterior spondylolisthesis and spinal ligament hypertrophy are two indications of degenerative lumbar spine degeneration. For some people, surgery is the sole option for relief.¹⁰ Lumbar spine degeneration carries a number of dangers. CSF leaks, nerve root damage, and surgical complications are all examples of this.¹¹ The patients in our study had a mean age of 38 years. In this study, patients were distributed around 50/50 between men and women. The great majority of patients, however, were spared the tragedy of having an unintentional durotomy.

Ullah et al. discovered that their 186 patients had a 1.33:1 male to the female patient ratio when it came to gender, with 106 males and 80 women being among those that participated. The participants in this research ranged in age from 20 to 60 years old, with the average age being 20 years. By happenstance, eight instances of durotomies were unearthed in a museum (4.30%). Three persons had intervertebral disc prolapse, and five people had lumbar stenosis, according to the findings.¹² According to Abdul Wahid et al., a durotomy occurred in 8.33 percent of patients who underwent surgery.¹³ According to the findings of the research, PIVD (Prolapsed, herniated, or extruded intervertebral disc) surgery as well as laminectomy for spinal stenosis were shown to enhance the chance of developing incidental durotomy (12.5% vs. 6.66%, respectively). We discovered that their findings were consistent with our own.

It has been shown that there is a 6.6% incidence of incidental durotomy, with 2.81% occurring after laminectomy operations and the remaining occurring after fusion surgery.¹⁴ This seems to be the case, based on our investigation. Following surgery, Takahashi et al. discovered

that 4% of the patients and 3.3% of the disc levels had been durotomized unintentionally.¹⁵ A dural tear was found to be more prevalent in females than in males (5.6% vs. 4.4%). According to the American Academy of Neurology, dural tears are found in one in every four patients with lumbar disc herniation, one in every eight patients with spinal canal constriction without degenerative spondylosis, one in every nine patients with degenerative spondylosis, and one in every eighteen and a half percent of patients with cystic juxtafacet syndrome, among other conditions.

It is important to remember that when a herniated disc and its caudal margin were accidentally durotomized, the cranial lamina and its caudal margin, as well as the medial facet joint at the point of insertion, were also affected. Spondylolisthesis and degenerative lumbar disc herniation are two conditions that are more likely to cause dural tears. According to Khan et al., when it comes to treating degenerative disc degeneration in the lower spine, 5.7% of patients encountered an unintentional durotomy.¹⁶ As shown by the male-to-female ratio of 1.9:1, an estimated 67% of the population was composed of males. Other patients had stenosis, some had multiple-level disease, and others required a second surgery as a result of the complications that occurred during the first.

CONCLUSION

The frequency of incidental durotomy was 6% during surgery for degenerative lumbar spine diseases.

REFERENCES

1. Ullah W, Ali M, Khan Z. Frequency of incidental durotomy during surgery for degenerative lumbar spine disease: An experience in neurosurgery department of a tertiary care hospital. *J Postgrad Med Inst.* 2018; 32 (1): 99–102.
2. Blecher R, Anekstein Y, Mirovsky Y. Incidental Dural Tears during Lumbar Spine Surgery: A Retrospective Case Study of 84 Degenerative Lumbar Spine Patients. *Asian Spine J.* 2014; 8 (5): 639–45.
3. Bydon M, Macki M, Abt NB, Sciubba DM, Wolinsky JP, Witham TF, et al. Clinical and surgical outcomes after lumbar laminectomy: An analysis of 500 patients. *Surg Neurol Int.* 2015; 6 (Suppl. 4): 190–3.
4. Adam D, Papacocea T, Iliescu R, Hornea I, Moisescu C. Incidental durotomy in lumbar spine surgery – incidence, risk factors and management. *Romanian Neurosurg.* 2015; 22 (1): 20–6.
5. Abdul Wahid T, Abdul Wahid AT, Salah A. Unintended durotomy during degenerative lumbar spine surgery (Incidence and management). *J Fac Med Baghdad,* 2014; 56 (4): 347–51.
6. Ayub S, urRehman R, Khattak RU. Incidence and Management Outcome of Incidental Durotomy in Spinal Procedures in Tertiary Care Hospital. *Pak J Neurol Surg.* 2017; 21 (3): 155–8.
7. Meng YB, He X, Huang YF, Wu QN, Zhou YC, Hao DJ. Multivariate analysis of risk factors for predicting incidental durotomy in lumbar surgery. *Int J Clin Exp Med.* 2016; 9 (10): 20014–9.
8. Ulrich NH, Burgstaller JM, Brunner F, Porchet F, Farshad M, Pichierri G, et al. The impact of incidental durotomy on the outcome of decompression surgery in degenerative lumbar spinal canal stenosis: analysis of the Lumbar Spinal Outcome Study (LSOS) data – a Swiss prospective multi-center cohort study. *BMC Musculoskelet Disord.* 2016; 17 (1): 170.
9. Ali M, Khan HM, Khanzada K, Usman M, Hussain R, Rehman Z. Level of spinal involvement in patients operated for spinal tuberculosis. *J Postgrad Med Inst.* 2012; 26 (4): 439-43.
10. The Express Tribune. Tuberculosis attacks the spine in 6 out of every 10 cases [Online]. 2010 [cited on 2012 Sep 15]. Available from URL: <http://tribune.com.pk/story/12213/tuberculosis-attacks-the-spine-in-6-out-of-every-10-cases/>
11. Aryan HE, Lu DC, Acosta FL, Ames CP. Corpectomy followed by the placement of instrumentation with titanium cages and recombinant human bone morphogenetic protein-2 for vertebral osteomyelitis. *J Neurosurg.* 2007; 6 (1): 23-30.
12. Ullah W, Ali M, Khan Z. Frequency of incidental durotomy during surgery for degenerative lumbar spine disease: an experience in neurosurgery

- department lady reading hospital Peshawar. J Postgrad Med Inst. 2018; 32 (1): 99-102.
13. Abdul Wahid T, Abdul Wahid AT, Salah A. Unintended durotomy during degenerative lumbar spine surgery (Incidence and management). J Fac Med Baghdad, 2014; 56: 347-51.
 14. Khan JA, Yadav SK, Tian R, Xia G, Xu T, Jia Y. Outcome of Incidental Unrepaired Dural Tear during Lumbar Spine Surgery: Comparisons of Subfacial Drain with or without Subarachnoid Drain. J Spine Neurosurg. 2015; 4: 1.
 15. Takahashi Y, Sato T, Hyodo H, Kawamata T, Takahashi E, Miyatake N, Tokunaga M. Incidental durotomy during lumbar spine surgery: risk factors and anatomic locations: clinical article. J Neurosurg Spine, 2013; 18 (2): 165-9.
 16. Khan Z, Sharafat S, Siddique M, Ali M, Alam I. Incidental durotomy during degenerative lumbar spine surgery: incidence and risk factors. KUST J Med Sci. 2013; 6 (2): 293-95.

Additional Information

Disclosures: Authors report no conflict of interest.

Ethical Review Board Approval: The study was conformed to the ethical review board requirements.

Human Subjects: Consent was obtained by all patients/participants in this study.

Conflicts of Interest:

In compliance with the ICMJE uniform disclosure form, all authors declare the following:

Financial Relationships: All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work.

Other Relationships: All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

AUTHORS CONTRIBUTIONS

Sr.#	Author's Full Name	Intellectual Contribution to Paper in Terms of:
1.	Abdul Aziz Khan	1. Study design and methodology.
2.	Amer Zaman	2. Paper writing and data calculations.
3.	Baynzair Khan	3. Data collection and calculations.
4.	Attiya Nasir Siddique, Idrees Ahmed	4. Analysis of data and interpretation of results etc.
5.	Mohammad Waseem, Aqsa Shehzadi, Rafia Khurshid	5. Literature review and referencing.
6.	Nisar Ahmed, Sidra Asghar, Khalid Zadran	6. Analysis of data and quality insurer.