

Incidence and Management Outcome of Incidental Durotomy in Spinal Procedures in Tertiary Care Hospital

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ABSTRACT

Objective: To know the incidence and management outcome of incidental durotomy in spinal procedures in tertiary care hospital.

Materials and Methods: This descriptive study was carried out in Neurosurgery Department, Hayatabad Medical Complex, Peshawar, from 1st July 2015 to 30 June 2017. All those patients in whom lumbar spinal procedures were done were included in the study without age or gender discrimination. Exclusion criteria included patients in whom dura was intentionally opened as in cases of intradural tumors or in rare cases of transdural discectomies. Those patients were also excluded in whom procedure was done elsewhere and they were admitted in ward for management. All patients were reviewed by age, sex, indications of surgery and subsequent management of durotomy. Data was analyzed in SPSS version 10.

Results: Total 560 patients qualified the selection criteria. There were 342 (61.07) male and 318 (38.93%) female patients. Amongst those operated, 294 (52.5%) patients had lumbar disc herniations, 143 (25.54%) patients were operated for lumbar spinal stenosis, 75 (13.39%) patients were treated for traumatic lumbar vertebral fractures, 38 (6.79%) patients had extradural spinal tumors and 10 were operated for lumbar spondylolisthesis. We noticed incidental durotomies in 50 (8.92%) cases. Of 342 male patients the incidence of durotomy was 20 (3.57%) while of 318 female patients the incidence was 30 (5.36%). All dural tears were recognized during the operation. Forty seven (47) dural tears were repaired primarily. We did re exploration in one patient for persistent leak in whom dural stitches were torn. Kerrisonrongeur was responsible for dural tear in 14. In 11 cases dissector tear the dura. Three dural tears were caused by pituitary rongeur. One tear was caused directly by knife. Air drill was responsible for 4 tears when lamina was being drilled to thin out. We could not find any cause of dural tear in one case.

Conclusion: Unintentional duratomy is not an uncommon complication in neuro spinal procedures. This is more common female population and elderly patients with degenerative spinal diseases.

INTRODUCTION

Incidental durotomy in spinal surgery is a familiar complication to neurosurgeons. This can have no effect at all on patient to devastating consequences. The incidence of incidental durotomy varies from 1 – 17% and depends largely on the type and complexity of the spinal procedures performed.^{1,2} This largely depends on surgeons experience, patients increasing age and female gender.³⁻⁶

As there has been wide range of variation in the incidence of incidental durotomy, the present study is

being conducted to evaluate the incidence of incidental durotomies during the different types of spinal procedures in our center to find the most common causes of incidental durotomies, the types of procedures during which the durotomies occurred and how it subsequently were managed.

MATERIAL AND METHODS

This descriptive study was carried out in neurosurgery department, Hayatabad Medical Complex, Peshawar

from 1st July 2015 to 30 June 2017. Prior approval was taken from ethical committee of Research, HMC, Peshawar.

Informed written consent was taken from the patients explaining the purpose of study and its effects on patients care. The patient's record was taken from patient's data base of our ward computer and retrospectively analyzed. All those patients in whom lumbar spinal procedures were done were included in the study without age or gender discrimination. Exclusion criteria included patients in whom dura was intentionally opened as in cases of intradural tumors or in rare cases of transdural discectomies. Those patients were also excluded in whom procedure was done elsewhere and they were admitted in ward for management.

All patients were reviewed by age, sex, indications of surgery and subsequent management of durotomy.

Patients' data was recorded in semi structured proforma. The data was then analyzed by SPSS version 10. Frequency and percentage was calculated for categorical variables. Mean \pm SD was calculated for age. Results were presented as graphs and tables.

RESULTS

Total 560 patients qualified the selection criteria. Patients with different types of spinal procedures performed in our department were analyzed retrospectively. There were 342 (61.07) male and 318 (38.93%) female patients.

Table 1: Gender Distribution of Study Population.

S. No.	Gender	Number of Patients	Percentage
1	Male	342	61.07%
2	Female	318	38.93%

Amongst those operated, 294 patients had lumbar disc herniation, 143 patients were operated for lumbar spinal stenosis, 75 patients were treated for traumatic lumbar vertebral fractures, 38 patients had extradural spinal tumors and 10 were operated for lumbar spondylolisthesis.

In this study population we noticed incidental durotomies in 50 (8.92%) cases. Of 342 male patients the incidence of durotomy was 20 (3.57%) while of 318 female patients the incidence was 30 (5.36%). This genders difference was also statistically significant.

Table 2: Indications of Lumber Region Spinal Surgeries.

S. No.	Etiology	Number Operated	Percentage
1	Lumbar disc herniation	294	52.5%
2	Spinal stenosis	143	25.54%
3	Vertebral fractures	75	13.39%
4	Extradural spinal tumor	38	6.79%
5	Spondylolisthesis	10	1.79%

We were able to recognize all dural tears during the operation. Forty seven (47 = 94%) dural tears were repaired primarily by applying 4 – 0 waxed silk in continuous manner. A blood soaked surgical or fats followed by spongoston packing was done over the dura after primary repair. Three (3 = 6%) patients had dural tears in unstichable area. These were sealed with dural sealant, fats and spongoston. In one patient amongst these three additional lumbar drain was placed and removed after two days. In all repaired cases, valsalva maneure was applied to make sure that no leak occurs after repair. Patients were advised bed rest for 48 hours post operatively. We did re exploration in one (2%) patient for persistent leak in whom dural stitches were torn.

Table 3: Insulting factors responsible for dural tear.

S. No.	Insulting Factor to Dura	No of Patients	Percentage
1	Karrison Rongeur	23	46%
2	Dissector	18	36%
3	Pituary Rongeur	6	12%
4	Knife	2	4%
5	Unidentifiable cause	1	2%

We noted that Kerrison rongeur was responsible for dural tear in 14 patients. In 11 cases dissector tear the dura when piece of bone or ligamentum flavum was being released from the underlying dura. Three dural tears were caused by pituary rongeur. One tear

was caused directly by knife. Air drill was responsible for 4 tears when lamina was being drilled to thin out. We could not find any cause of dural tear in one case.

DISCUSSION

Incidental dural tears are not uncommon in neurosurgical procedures¹. This condition has to be recognized pre-operatively, otherwise serious complications may happen which may lead to meningitis or even death of the patients. Persistent CSF leak leads to symptoms like nausea, vomiting, postural headache, dizziness, photophobia, tinnitus and vertigo due to decrease in the volume of CSF.^{7,8}

In this study we noted incidental durotomies in 50 (8.92%) cases. Various studies in literature has given various ranges which stat from 1 up to 17%.^{4,7,9} This variation is however because of multicentre study designs and questionnaires based surveys.^{3,10}

We studied 342 male patients in which we noted durotomies in 20 (3.57%) patients while of 318 female patients the incidence was 30 (5.36%). This genders difference is statistically significant.

Different studies indicated that increasing age and female gender has been associated with increased incidence of incidental durotomies.^{1,3} Our study results are in line with previous researchers work.

With aging process the degenerative changes occurs that decreases the diameter of the spinal canal. These changes include ligamentum flavum hypertrophy, osteophytes formation and facet hypertrophy. All these factors affects the incidence of dural tears. So is spondylolisthesis which also the canal diameter decreases leading to increase incidence of dural tears. Several other studies^{1,3,11} also reported these degenerative changes to be risk factor for incidental dural tears. Wang et al. in his research paper published 18 different diseases association with dural tears and found that patients with spinal canal stenosis without spondylolisthesis demonstrated 13% of incidental dural tears. Hence, based on ours' and others'^{12,3} findings elderly female patients with degenerative spondylolisthesis and associated stenosed vertebral canal should be counseled about high risk of dural tears and its subsequent management.

In this study we see that Kerrisonrongeur is responsible for dural tear in 23 (46%) patients. In 18 (36%) cases dissector teared the dura .In other local studies¹ rongueur is the commonest cause follofed by dissector injuries.

CONCLUSION

Unintentional duratomy is not an uncommon complication in neurospinal procedures. This is more common in female population and elderly patients with degenerative spinal diseases. The commonest cause of duratomy is karrison ranjour during laminectomy.

This study is being conducted on a relative smaller number of patients. Moreover the surgeries were performed by various surgeons irrespective of their experiences. A larger population studies and selection of patients being operated by surgeons with comparable experience is recommended to establish the study results with more confidence.

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REFERENCES

1. Farooq G, Shaikh A, Aorangzeb, Alishah, Altaf S. "Incidental dural tears during lumbar spine surgery: Risk factors, Location, incidence, complications, treatment and clinical outcome." Pak J Surg. 2013; 29 (3): 205-210.
2. Hodges SD, Humphreys SC, Eck JC, Covington LA. Management of incidental duratomy without mandatory bed rest. A retrospective review of 20 cases. Spine (Phila Pa 1976), 1999; 24: 2062-2064.
3. 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. J Neurosurg spine, 2013; 18: 165-169.
4. Guerin P, Benchikh A, Fegoun El, et al. Incidental duratomy during spine surgery: Incidence, management and complications. Journal.
5. Deyo RA , Cherkin DC, Loeser JD, et al. Morbidity and mortality in association with operations on lumbar spine. J Bone Joint Surg. 1992; 74A: 536-43.
6. Eismont FJ, Wiesel SW, Rothman RH. Treatment of dural tears associated with spinal surgery. J Bone and Joint Surg [Am], 1981; 63: 1132-6.
7. Cammisa FP Jr, Giradi FP, Sangani PK, Parvataneni HK, Cadag S, Sandhu HS: Incidental duratomy in spine surgery. Spine, 2000; 25: 2663-2667.
8. Saxler G, Kramer J, Barden B, Kurt A, Pfortner J, Bernsmann K: The long-term clinical sequelae of incidental duratomy in lumbar disc surgery. Spine, 2005; 30: 2298-2302.
9. Barrios C, Ahmed M, Arroategui JI, et al. Clinical fac-

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- tors predicting outcome after surgery for herniated lumbar disc: an epidemiological multivariate analysis. *J Spinal Disord.* 1990; 3: 205-9.
10. Tafazal SI, Sell PJ: Incidental durotomy in lumbar spine surgery: Incidence and management. *Eur Spine J.* 2005; 14: 287-290.
11. Epstein NE: The frequency and etiology of intra-operative dural tears in 110 predominantly geriatric patients undergoing multilevel laminectomy with non-instrumental fusions. *J Spinal Disord Tech.* 2007; 20: 380-386.
12. Wang JC, Bohlman HH, Riew KD: Dural tears secondary to operations on lumbar spine. Management and results after a two years minimum follow-up of 88 patients. *J Bone and Joint Surg Am.* 1998; 80: 1728-1732.

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