Incidence and Management Outcome of Incidental Durotomy in Lumber Spinal Procedures

Nadia Iqbal[1], Zain ul Abedeen[2], Riaz ur Rehman[3]

ABSTRACT

Background: Incidental durotomy is a common complication of lumbar spine surgeries. Its incidence depends on several factors and the incidence varies from center to center.

Objectives: To know the incidence and management outcome of incidental durotomy in neurospinal procedures in a tertiary care hospital .

Material & Methods: This descriptive study was conducted in neurosurgical unit of Hayatabad Medical Complex, Peshawar from 15 July 2015 to 14 July 2017. Patients in whom incidental durotomy occurred were included in study without age or gender discrimination. Patients in whom dura was intentionally opened were excluded from the study. Primary repair was attempted in all patients Their ages, gender, indications of surgery were reviewed and subsequent management of durotomy was documented. Patients' data analyzed in SPSS 18.

Results: Amongst 563 patients there were 344(61.10%) male and 319(38.90%) female patients Amongst those operated, 295(52.30%) patients had lumbar disc herniation, 144(25.53%) patients had spinal stenosis, 76(13.47%) patients had traumatic lumbar vertebral fractures. Incidental dural tear was noticed in 51 (9.04%) patients. Incidence of durotomy was 21(3.36%) in male and 31(5.50%) female patients. We identified dural tears site in all patients during the surgery. Forty six (46=90.20%) dural tears were repaired primarily. Five (3=6%) patients had dural tears in unstichable area .Reexploration was done in 2(3.92%) patient. Kerrison rongeur was responsible for dural tears in 25 patients. In 15 cases dissector tore the dura .

Conclusion: Unintentional duratomy is relatively common complication especially in female and elderly patients.

Keyword: *Incidental durotomy, Incidence, Management*

This article may be cited as: Iqbal N, Abedeen Z, Rehman R.
Incidence and Management outcome of Incidental Durotomy in Lumber Spinal Procedures.JSMC 2019;9(1):51-4.

INTRODUCTION

Incidental dural tear in neurospinal surgery is not an uncommon complication being faced by neurosurgeons. This may results in significant increase in mortality or morbidity of the patients. The incidence of dural injury ranges from 1-17% depending upon the type and complexity of the spinal procedures performed[1, 2]. Surgeons experience play significant role in it. Similarly patients increasing age and female gender are other contributory factors [(3), (4), (5), (6).]

A study was conducted to see the incidence of incidental durotomies and it was found to be the second most common complication in malpractice cases. Incidental durotomy can be very serious complication at time and may even lead to meningitis and death of the patient. Some other Common complications include pseudomeningocele formation, persistent CSF leak and arachnoiditis and subsequent chronic Pain are all related to dural tears and CSF leakage after spinal surgery[7].

However some studies ruled out any long term complications after effectively managing the complication well in time[8].

The main risk factors for this condition are obesity and surgical experience. This study aims to estimate the incidence of unintentional durotomy during surgeries for various lumbar spinal disorders and the intraoperative and postoperative management of this complication. Due to the fact that there has been significant variation in the incidence of dural tear, this study is being carried to know the incidence of incidental durotomies in various spinal procedures in our department and know the most common causes of this this serious complication. Moreover this will help in finding out the appropriate way of incidental durotomies management.

1. Department of Neurosurgery Hayatabad Medical Complex, Peshawar.
2. SMO Saidu teaching Hospital
3. Neuro Surgery Department MTI, Lady Reading Hospital, Peshawar

Correspondence: Dr Riaz ur Rehman, Assistant Professor, Neurosurgery department, MTI, LRH, Peshawar, KP. drriazurrehman@yahoo.com, Cell: 0333-9250932

Received: August 07th 2018, Accepted: April 10th 2019

MATERIAL & METHODS

This descriptive study was conducted in neurosurgical unit of Hayatabad Medical Complex, Peshawar from 1st July 2015 to 30 June 2017. Approval from ethical committee of Research, HMC, Peshawar taken before we started this study.

We explained the purpose of the study to all patients and then informed written consent was taken from them. We retrieved the patient's record from patient's data base of our ward computer and retrospectively analyzed.

All those patients in whom incidental durotomy occurred were included in this research project without age or gender discrimination. The patients in whom dura was intentionally opened as in cases of intradural tumors or those in whom procedure was done elsewhere and they were admitted in ward for management , were excluded from the study.

In all those patients in whom incidental durotomy occurred, we tried to repair it primarily by applying 4-0 waxed silk in continuous manner. A blood soaked surgicel or fats followed by spongeston packing was done over the dura after primary repair. Unstichable area were sealed with dural sealant ,fats and spongeston. Additional lumber drain was placed and removed after two days in unstichable cases. 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. Their ages, gender, indications of surgery were reviewed and subsequent management of durotomy was documented.

Patients' data was recorded in pre formed proforma. The data was then analyzed by SPSS-18 version. Frequency and percentage was calculated for categorical variables. Mean ± SD was calculated for age. Results were presented as graphs and tables.

RESULTS

There were total 563 patients who were selected for the study according to inclusion and exclusion criteria. Different types of spinal surgeries performed in our department were analyzed retrospectively. There were 344(61.10%) male and 319(38.90%) female patients .

Amongst those operated, 295 patients had lumbar disc herniation, 144 patients were operated for lumbar spinal stenosis, 76 patients were treated for traumatic lumbar vertebral fractures. Various indications of the surgery are given in the table no 1.

Incidental dural tear was noticed in 51 (9.04%) patients. Of those 344 male patients the incidence of durotomy was 21(3.36%) while of 319 female patients the incidence was 31(5.50%).The diffence of incidental durotomy in two different sexes is statistically significant.

We appreciated the site all dural tears during the surgery. Forty six (46=90.20%) dural tears were repaired primarily by applying 4-0 waxed silk in continuous manner. Five(3=6%) patients had dural tears in unstichable area and could not be repaired primarily . Reexploration was done in two(3.92%) patient for persistent leak in whom we noted that dural stitches were torn .

We noted that Kerrison rongeur was responsible for majority of the cases of dural tears i.e. in 25 patients . In 15 cases dissector tore the dura when piece of bone or ligamentum flavum was being released from the underlying dura. The various etiological factors are shown in table 2 .

Table No 1 = Indications of lumber region spinal surgeries

S No	Etiology	Number operated	Percentage
1	Lumbar disc herniation	295	52.30%
2	Spinal stenosis	144	25.53%
3	Vertebral fractures	76	13.47%
4	Extradural spinal tumor	38	6.73%
5	Spondylolistheis	10	1.77%

Table No 2 : Insulting factors responsible for incidental duratomy

S.No	Insulting factor to dura	No of patients	Percentage
1	Karrison Rongeur	25	49.01%
2	Dissector	15	29.41%
3	Pituatery rongeur	6	11.76%
4	Knife	3	5.88%
5	Unidentifiable cause	2	3.92%

DISCUSSION

Incidental dural injuries are relatively common in neurospinal proceedures[1]. Incidental durotomy if not identified and rectified per operatively, may lead to persistent CSF leak, meningitis or even death of the patients. Symptoms like nausea, vomiting, postural headache, dizziness, photophobia, tinnitus and vertigo due to decrease in the volume of CSF may results from persistent CSF leak [9, 10].

In this study we noted incidental durotomies in 51 (9.04%) patients. Different research studies in literature has given various ranges which start from 1 up to 17 %. [4, 9, 11]. Various factor are affecting this figure like being done in multicentres and questionnaires based surveys [3, 12].

We did this study on 344 male patients in which we noted durotomies in 21(3.36%) patients while of 319 female patients the incidence was 31(5.50%).This is a significant genders difference statistically.

Previous research shows that increasing age and female gender has been associated with increased incidence of incidental durotomies [1, 3]. Our study findings are in keeping with previous authors work.

Degenerative changes like yellow ligament hypertrophy, osteophytes formation and facet hypertrophy occurs in advanced age that decrease the diameter of the spinal canal. All these factors predispose the dural to injuries in spinal surgeries. Similarly spondylolisthesis which also decreases the canal diameter leads to increase incidence of duratomy. Several researchers work [3], [13] reveals these degenerative changes to be risk factor for incidental dural tears. Wang et al. identified 18 different diseases association with dural injuries and found that patients with spinal canal stenosis without spondylolisthesis showed 13% of incidental duratomies. Hence, based on the findings of the present study and other's work [14], [3] elderly female patients with degenerative spondylolisthesis and associated stenoses of vertebral canal should be counseled about high risk of dural injuries and its subsequent management. Kerrison rongeur is responsible for dural tear in majority of incidental durotomy cases i.e. 25(49.01%) patients. In 18 (29.41%) cases dissector caused tear in the dura. We see similar trend of findings in other local studies[1] in which rongueur is the commonest cause followed by dissector injuries.

Relatively smaller number of patients were enrolled in this study and the surgeries were performed by different surgeons of various experiences irrespective of their experiences. I recommend larger population studies and selection of patients being operated by surgeon s of reasonable experience in neurospinal surgeries to establish the study results with high level confidence.

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. the commonest cause of duratomy is karrison ranjour during laminectomy.

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)24:2062-2064, 1999
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,a retrospective review. Injury. 2012 Apr;43(4):397-401
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.Treaaatment of dural tears associated with spinal surgery.J Bone and Joint Surg [Am] 1981;63:1132-6.
7. Goodkin R, Laska LL. Unintended “incidental” durotomy during surgery of the lumbar spine: medicolegal implications. Surg Neurol. 1995;43:412. doi: 10.1016/0090-3019(95)80031-B.
8. Alexander A, Jones M, Stambough JL, et al. Long-term results of lumbar spine surgery complicated by unintended incidental durotomy. Spine. 1989;14(4):443-446
9. Cammisa FP Jr, Giradi FP, Sangani PK, Parvataneni HK, Cadag S, Sandhu HS:Incidental duratomy in spine surgery.Spine 2000;25;2663-2667.
10. Saxler G, Kramer J, Barden B, Kurt A, Pfortner J, Bernsmann K: Th e long-term clinical sequelae of incidental duratomy in lumbar disc surgery.Spine 2005; 30:2298-2302
11. Barrios C, Ahmed M, Arrotegui JI, et al.Clinical factors predicting outcome aft er surgery for herniated lumbar disc:an epidemiological multivariate analysis.J Spinal Disord 1990;3:205-9.
12. Tafazal SI, Sell PJ:Incidental duratomy in lumbar spine surgery:Incidence and management. Eur Spine J 14:287-290, 2005.
13. Epstein NE:Th e frequency and etiology of intraoperative dural tears in 110 predominantly geriatric patients undergoing multilevel laminectomy with noninstrumental fusions.J Spinal Disord Tech 2007;20:380-386.
14. Wang JC, Bohlman HH, Riew KD:Dural tears secondary to operations on lumbar spine.Management and results aft er a two years minimum follow up of 88 patients.J Bone and Joint Surg Am 1998;80:1728-1732.