

Examine the Frequency and Risk Factors of Incidental Durotomy in Patients Undergoing Spinal Surgeries

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ABSTRACT

Aim: To examine the prevalence and risk factors of incidental durotomy in patients undergoing surgical treatment for spinal disorders.

Study Design: Descriptive/Observational study

Place & duration: Department of Orthopedic & Neurosurgery, Aziz Bhatti Shaheed Teaching Hospital Gujrat from January 2015 to June 2018.

Methods: A total of 100 patients of both genders visited hospital for spinal fractures were included in this study. Patient's ages were ranging from 20 to 70 years. All the patients received thoracolumbar spinal surgeries. Patient's detailed medical history including age, sex, residency were noted after taking informed consent from all the patients. Types of thoracolumbar spinal surgeries & the prevalence of incidental durotomy and factors associated to incidental durotomy were recorded.

Results: Out of total 100 patients 66 (66%) patients were men and rest 34% were women. 24 (24%) patients were ages between 20 to 30 years, 26 (26%) patients had ages 31 to 40 years, 22 (22%) patients were ages 41 to 50 years, 18(18%) patients had ages 51 to 60 years and 10 (10%) patients had ages above 60 years. Lumbar disc herniation was the most common indication among lumbar spinal surgeries 54 (54%) followed by spinal stenosis and vertebral fractures 21 (21%) and 14 (14%) patients. Incidental durotomy prevalence was 12% in 12 patients.

Conclusion: Incidental durotomy was the common complication found in patients undergoing spinal surgeries and karrison rongeur was the most common factor responsible for dural tear.

Keywords: Thoraco-lumbar Spinal Surgeries, Durotomy, Risk factors

INTRODUCTION

Incidental durotomy is defined as an unintended dural laceration or tear.[1] Incidental dural tears are among the most commonly seen complications in spine surgery.[2,3] The incidence reported in the literature ranges from 1.7% to 16%.[4-9] This largely depends on surgeons experience, patients increasing age and female gender.[5-6]. Most of the dural tears occur during the decompression procedure and the primary tool involved is the Kerrison's rongeur.[7] The dura can be injured by a pedicle probe or a pedicle screw if it breaches the medial wall of the pedicle. Incidental durotomy is also frequently encountered during the exposure in post laminectomy patients (revision surgeries) due to loss of anatomic landmarks and tissue adhesions. Several consequences of inadequately treated dural tears have been reported. If the dural tear is not properly closed or unrecognized, patients can present with postural headaches, vertigo, posterior neck pain, nausea, photophobia, tinnitus and blurred vision.[8-11] These symptoms are due to intracranial hypotension caused by a persistent CSF leak from the subarachnoid space.

The present study was conducted aimed to examine the frequency of incidental durotomies in different thoracolumbar spinal surgeries & the factors causing incidental durotomies.

Received on 15-05-2019

Accepted on 05-08-2019

METHODS

This descriptive/observational study was conducted at Department of Orthopedic & Neurosurgery Aziz Bhatti Shaheed Teaching Hospital Gujrat from January 2015 to June 2018. In this study a total of 100 patients of both genders visited hospital for spinal fractures were included in this study. Patient's ages were ranging from 20 to 70 years. All the patients received thoracolumbar spinal surgeries. Patients detailed medical history including age, sex, residency were noted after taking informed consent from all the patients. Patients in whom dura were intentionally opened as in cases of intradural tumors or in rare cases of transdural discectomies were excluded from this study & also whom procedure was done elsewhere and they were admitted in ward for management. Types of thoracolumbar spinal surgeries, prevalence of incidental durotomy and factors associated to incidental durotomy were recorded. All the data was analyzed by computer software SPSS 20.

RESULTS

There were 66 (66%) male patients and while 34 (34%) female patients. 24 (24%) patients were ages between 20 to 30 years, 26 (26%) patients had ages 31 to 40 years, 22 (22%) patients were ages 41 to 50 years, 18 (18%) patients had ages 51 to 60 years and 10(10%) patients had ages above 60 years. 56 (56%) patients had urban residency

while 44 (44%) patients had rural residency. The etiology of spinal fractures were noted such as road traffic accident, Fall, sports, violent acts and others in 53(53%), 22(22%), 10(10%), 9(9%) and 6(6%) patients respectively (Table 1).

Lumbar disc herniation was the most common indication among lumbar spinal surgeries 54 (54%) followed by spinal stenosis, vertebral fractures, extradural spinal tumor and spondilolisthesis in 21 (21%), 14 (14%), 8 (8%) and 3 (3%) patients respectively (Table 2)

From all the spinal surgeries incidental durotomies done in 12(12%) patients, in 12 incidental durotomies 5 (5%) were males while 7(7%) patients were females. (Table 3) Factors causing for dural tear were noted as Karrison Rongeur in (50%) patient, dissector in 3(25%), pituatory Rongeur in 1(8.33%), knife in 1(8.33%) and 1 (8.33%) case was unidentified. (Table 4)

Table 1: Demographic information of the patients

Variable	No	%
Gender		
Male	66	66.0
Female	34	34.0
Age (years)		
20 -30	24	24.0
31 – 40	26	26.0
41 -50	22	22.0
51 – 60	18	18.0
> 60	10	10.0
Residency		
Urban	56	56.0
Rural	44	44.0
Trauma causes		
RTA	53	53.0
Fall	22	22.0
Sports	10	10.0
Violent acts	9	9.0
Others	6	6.0

Table 2: Indication of lumbar spinal surgeries

Indication	No	%
Lumbar disc herniation	54	54.0
Spinal stenosis	21	21.0
Vertebral fractures	14	14.0
Extradural spinal tumor	8	8.0
Spondilolisthesis	3	3.0

Table 3: Frequency of incidental durotomy

Durotomy	No	%
Yes	12 (5M/7F)	11.0
No	89	89.0

Table 4: Factors causes for dural tear among incidental durotomies (n=24)

Factors	No	%
Karrison Rongeur	6	50.0
Dissector	3	25.1
Pituatory rongeur	1	8.3
Knife	1	8.3
Unidentified	1	8.3

DISCUSSION

In present study total one hundred patients whom had received surgical treatment for thoracolumbar spinal region were included in this study. Out of 100 patients 66%

patients were male while 34% patients were females. Male patient’s population was high in our study as compared to females. These results shows similarity to some other studies conducted regarding thoracolumbar spinal surgeries in which majority of patients were male.60 to 75%^{12,13}. We found that most of the patients were ages 20 to 50 years. These results were similar to another study in which patients ages were ranging from 25 to 55 years¹⁴.

In present study, we found that 56% patients had urban residency and the most common cause of spinal fractures was road traffic accidents 53%. The results were correlated to some other study in which the most common cause of spinal trauma was reported as road traffic accidents and most of the patients belongs to urban area.[15] in recent study, we found lumbar disc herniation 54% was the most frequent indication of lumbar spinal surgeries followed by spinal stenosis, vertebral fractures, extradural spinal tumor and spondilolisthesis in 21(21%), 14%, 8% and 3% patients respectively. The results were similar to some other studies in which lumbar disc herniation and spinal stenosis were the most common indication of lumbar spinal procedures 52.5% and 25.54%^{16,17}.

In current study, the incidental durotomies amongst all the spinal surgeries were 12% and female patients rate was high as compared to males. We found that patients with elderly ages had a high prevalence of incidental durotomies. These results were comparable to some other studies in which incidental durotomies rate was 8 to 17% and female patients had high prevalence than the males^{18,19}.

We observed that factors responsible for dural tear were noted as Karrison Rongeur in 6(50%) patient, dissector in 3(25%), pituatory rongeur in 1(8.33%), knife in 1(8.33%) and 1(8.33%) case was unidentified. The results regarding factors for dural tear were similar to other previous studies in which Karrison Rongeur was the most common factor responsible for dural tear^{20,21}.

CONCLUSION

Lumbar spinal fracture was the most common disorder found in Orthopaedic & Neurosurgical settings. It is concluded from this study that incidental durotomy was a common complication found amongst thoracolumbar spinal surgeries and Karrison Rongeur was the most common factor responsible for dural tear and most of the patients were females and of elderly ages. Early and better management may helps to reduce the complication rate.

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: 2062-4.
3. Takahashi Y, Sato T, Hyodo H, Kawamata T, Taka-hashii E, Miyatake N, Tokunaga M. Incidental durotomy during lumbar spine surgery: risk factors and anatomic locations. J Neurosurg Spine 2013; 18: 165-9.

4. Guerin P, Benchikh A, Fegoun EI, et al. Incidental durotomy during spine surgery: incidence, management and complications. *Journal*
5. Cammisa FP Jr, Giradi FP, Sangani PK, Parvataneni HK, Cadag S, Sandhu HS: Incidental durotomy in spine surgery. *Spine* 2000; 25: 2663-7.
6. Saxler G, Kramer J, Barden B, Kurt A, Pfortner J, Bernsmann K: The long-term clinical sequelae of incidental durotomy in lumbar disc surgery. *Spine* 2005; 30: 2298-2302.
7. Guerin P, El Fegoun AB, Obeid I, Gille O, Lelong L, Luc S, et al. Incidental durotomy during spine surgery: incidence, management and complications: a retrospective review. *Injury* 2012;43(4): 397–401.
8. Baker GA, Cizik AM, Bransford RJ, Bellabarba C, Konodi MA, Chapman JR, et al. Risk factors for unintended durotomy during spine surgery: a multivariate analysis. *Spine J.* 2012;12(2): 121–126.
9. McMahon P, Dididze M, Levi AD. Incidental durotomy after spinal surgery: a prospective study in an academic institution. *J Neurosurg Spine* 2012;17(1): 30–36.
10. Yoshihara H, Yoneoka D. Incidental dural tear in spine surgery: analysis of a nationwide database. *Eur Spine J* 2014;23(2): 389–394.
11. Takahashi Y, Sato T, Hyodo H, Kawamata T, Takahashi E, Miyatake N, et al. Incidental durotomy during lumbar spine surgery: risk factors and anatomic locations: clinical article. *J Neurosurg Spine.* 2013; 18(2): 165–9.
12. Weber C, Piek J, Gunawan D. Health care costs of incidental durotomies and postoperative cerebrospinal fluid leaks after elective spinal surgery. *Eur Spine J* 2015(9): 2065–8
13. Smorgick Y, Baker KC, Herkowitz H, Montgomery D, Badve SA, Bachison C, et al. Predisposing factors for dural tear in patients undergoing lumbar spine surgery. *J Neurosurg Spine* 2015;22(5): 483-6.
14. Yoshihara H, Yoneoka D. Incidental dural tear in cervical spine surgery: analysis of a nationwide database. *J Spinal Disord Tech* 2015;28(1): 19-24.
15. Shahid Ayub et al. Incidental durotomy in spinal surgeries. *PJNS* 2017; 21(3): -----
16. Adam et al Incidental durotomy in lumbar spine surgery. *Romanian Neurosurgery (2015) XXIX (XXII) 1: 20 – 26.*
17. Yoshihara H, Yoneoka D. Incidental dural tear in lumbar spinal decompression and discectomy: analysis of a nationwide database. *Arch Orthop Trauma Surg* 2013;133(11): 1501-8.
18. Hong JY, Suh SW, Park SY, Modi HN, Rhyu IJ, Kwon S, et al. Analysis of dural sac thickness in human spine-cadaver study with confocal infrared laser microscope. *Spine J.* 2011;11(12): 1121–7.
19. Deyo RA, Cherkin DC, Loeser JD, et al: Morbidity and mortality in association with operations on the lumbar spine. The influence of age, diagnosis and procedure. *J Bone Joint Surg [Am]* 74: 536 – 543, 1992
20. Saxler G, Kramer J, Barden B, et al. The long term clinical sequelae of incidental durotomy in lumbar disc surgery. *Spine* 2005; 30: 2298 – 2302
21. Epstein NE. The frequency and etiology of intra-operative dural tears in 95 predominantly geriatric patients undergoing multilevel laminectomy with non-instrumental fusions. *J Spinal Disord Tech* 2017; 32: 276-86.