

Predisposing Factors for Dural Tear during Lumbar Spine Surgery

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Abstract

Background: Dural tear is a common complication of lumbar spine surgery. The aim of this prospective study was to identify the predisposing factors for dural tear in lumbar spine surgery.

Patients and Methods: We prospectively recorded data of 174 patients with lumbar spine surgery from 2013 to 2016 in Faculty of Medicine, Beni seuf University. We compared result obtain from the patients in which a dural tear occurred (Group A) and those in which a dural tear did not occur (Group B) excluded criteria are recurrent procedures, and intradural procedures.

All the patient data like age, sex clinical examination, and scheduled procedure, and intra-operative data (surgeon experience. Type and time of surgery) were record and compared between the two groups.

Results: 104 patients underwent discectomy, 50 patients underwent laminectomy. And 20 patients underwent lumber fixation. Among the 104 patients who underwent discectomy 5 patients had a dural tear. Among the 50 patients who underwent laminectomy 3 patients had dural tear. Among the 20 patient underwent lumber fixation 2 patients had dural tear. Patients with incidental durotomy were older (mean 60 ± 5 vs 50 ± 5 years), and had longer surgery (180 ± 30 vs 120 ± 30 minutes), compared with the patients without dural tear. The incidence was significantly higher with lumber fixation (prolonged surgery) when physician training was examined; residents were responsible for 50% of all dural tear.

Conclusion: Predisposing factors for dural tear were, older age, prolonged surgery, and the years of physician training or resident experience appear to be a major risk.

Key Words: Dural tear – Lumbar surgery – Predisposing factors – CSF.

Introduction

ACCIDENTLY intra operative tear of the dura is the commonest complication during lumbar spine surgery [1,2]. By reviewing the literature we found various factors affecting the happening of accidental durotomy during lumbar spine procedures, [3,4] in

many study, the incidence of dural tear was about 16%. They found that age of the patient was a risk factor [5]. However, a history of a lumbar surgery and the duration of the surgeon's training did not affect the incidence although other studies showed a higher occurrence of tears in recurrent spine surgeries, ranging.

From 2.1% to 15.9%, [6-8] the previously mentioned studies were retrospective studies and did not compare between affected and non affected people [9-12] if dural tear occurred and not managed in proper way, it can lead to CSF leak or psudomeningocele [13,14].

The aim of our study was to prospectively determine risk factors for intended durotomies during lumbar spine procedures.

Patients and Methods

We prospectively recorded data of 174 patients with lumbar spine surgery from March 2013 to March 2016 in Faculty of Medicine. Bani Seuf University. We compared result obtain from the patients in which a dural tear occurred (Group A) and those in which a dural tear did not occur (Group B).

Exclusion criteria:

- 1- All patient with recurrent surgeries.
- 2- All patients with intra dural procedure such as tumors.
- 3- All patients with traumatic dural tear.

All data are recording such as age, sex, and the indication of the spine surgery in each case, and the number of levels affected in each case the length of surgery (minutes), was also recorded, all these data were compared between patients who had intra operative dural tears and patients who did not have a dural tear. In the cases who suffered

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from accidental intra operative dural tear the rank of the surgeon was documented (resident, assistant lecture or senior staff) also the instrument was used and how it managed intra operatively. We did not document the site of the tear during the post operative period in those who had dural tear; we recorded any headache due csf loss specially on the first day and other complications such as leak or pseudo meningocele and the management of complications.

Results

In this study we documented the data of 174 patients underwent various degenerative lumbar procedures 104 patients of them underwent discectomy, 50 patients underwent laminectomy. And 20 patients underwent lumber fixation the total number of patients who had dural tear was 10 (5.74%) patients and their distribution between the different procedures was. Out the 104 patients who underwent discectomy 5 (4.8%) patients had a dural tear. Out the 50 patients who underwent laminectomy 3 (6%) patients had dural tear. And out of the 20

patient underwent lumber fixation 2 (10%) patients had dural tear. Out of these 10 patients with dural tear 6 (60%) patient were females the mean age in patients with accidental durotomy was $60 \pm 5y$, and the mean age in the non affected group was 50 ± 5 years so the dural tear group was older the mean surgical time in the accidental tear group was 180 ± 30 minutes while the mean surgical time in the other group was 120 ± 30 minutes so dural tear happened more in the longer surgery and also lumbar fixation was the highest incidence of dural tear, patients considering surgical experience and its relation with the durotomy resident were responsible for 50% of cases. Accidental tear occurred in 4 cases with dissector usage, and in 6 cases because of a kerrison. In 7 (70%) of the 10 cases of accidental dural tear, primary repair with 3-0 vicryle suture was the management, the other 3 patient of the tear was small or could not sutured so sheet of fat graft was used to close the tear. In the follow-up period, only 2 cases with dural tear complain from headache specially on first day of surgery.

Table (1): Number of disease in the study.

Disease	Number
Lumbar disc prolaps	104
Lumbar Canal stenosis	50
Spodylolisthesis	20

Table (2): Icedance of CSF leak in the study.

Disease	Number	Incidence
Lumbar disc prolaps	5	4.8%
Lumbar Canal stenosis	3	6%
Spodylolisthesis	2	10%

Discussion

In this prospective study, all data for patients who underwent lumbar surgery are collected to detect the incidence and predisposing factors for accidental dural tear. The incidence of unintended durotomy was range from 0.5% to 18%, such a big wide Range is due do multicenter studies, Wang et al., found a 14% incidence of dural tears [8]. Sin et al., found a 10% incidence of a dural tear in a 76 patients who underwent lumbar spine surgery for degenerative spine [10]. In the study conducted by Yoshimasa et al., the incidence was 4% [14] the incidence in our study was (5.7%) Epstein in his study reported that patients without dural tear were younger than those with dural tear (average age 69 vs. 74 years, respectively) [12]. We obtained similar results in our study (average age 50 vs. 60 years, respectively). The incidence of dural tear in our study was higher in females (60%) than males also more common in old age due to Degenerative changes such as (narrowing of the spinal canal, and thicker ligamentum flavum) Yoshimasa et al.,

reported that in patients with canal stenosis only the rate was 13% [14]. Our study found that the rate of dural tear was significantly higher in patients with degenerative spondylolisthesis (during lumbar fixation) (10%) than in those with other lumbar disorder. This higher incidence is a result from severe degenerative and adhesive changes around the lesion. In our study we had 2 cases suffered from csf leak they were managed with secondary sutures and frequent dressing with antibiotic coverage and we did not had any case with psudomeningocele with regard to clinical outcome, the literature is controversial. Cammisa et al., and Wang et al., reported that no long-term sequelae in cases with incidental dural tear [2,8]. Saxler and colleagues reported that poorer outcomes in cases with incidental dural tear, [15] in our study there was no significant squeuealae on the outcome.

Conclusions:

Risk factors for unintended durotomy were female sex, older age, degenerative spondylolisthesis, and younger surgeons with short experience.

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العوامل التي تعرض آلام الجافية للقطع أثناء عملية إستئصال الغضروف القطني

الهدف: إن قطع العومل التي تعرض آلام الجافية للقطع أثناء عملية إستئصال الغضروف القطني أحد المضاعفات الشائعة الحدوث الهدف من هذه الدراسة هو الوقوف على أهم العومل التي تعرض آلام الجافية أثناء جراحات الغضروف القطني.

الطريقة البحثية: هذه دراسة مستقبلية تضمنت عدد ٥٢٣ مريض في الفترة ما بين ٢٠١٣ إلى ٢٠١٦ تم إجراء جراحة إستئصال غضروف قطني في مستشفيات جامعة القاهرة ولقد تم تقسيم المرضى إلى مجموعتين الأولى تضمنت المرضى الذين حدث فيهم قطع آلام الجافية والثانية تضمنت هؤلاء الذين لم يحدث فيهم قطع للآلم الجافية تم جمع كل المعلومات الخاصة بالمرضى من حيث السن والنوع والعملية التي أجريت ولقد تم إستبعاد الحالات المرتجعة أو الحالات التي يلزم فيها الجراحة داخل آلام الجافية.

النتائج: في هذه الدراسة ٣١١ مريض تم إجراء جراحة إستئصال غضروف ومن بين هؤلاء فقط ١٣ مريض حدث فيهم قطع للآلم الجافية تضمنت الدراسة ١٥١ مريض تم إجراء عملية إستئصال للعظمية فقط من بينهم ٨ مرضى فقد حدث قطع في آلام الجافية وأخيرا عدد ١١ مريض تم إجراء عملية تثبيت للفقرات القطنية من بينهم ٥ مرضى تعرضوا لقطع في آلام الجافية. ولقد وجد أن قطع آلام الجافية أكثر حدوثا في المرضى الأكبر سنا أو تعرضوا لعمليات جراحية أطول في الوقت أو إجراء العملية بواسطة جراحين قليلي الخبرة.

الاستنتاج: العومل التي تجعل القطع الغير متعمد للآلم الجافية في جراحات العمود الفقري هي كبر سن المريض أو طول مدة الجراحة أو أن يتم إجراء الجراحة بواسطة الجراحين الصغار قليلي الخبرة.