Journal of Clinical Neuroscience xxx (2018) xxx–xxx

Contents lists available at ScienceDirect

Journal of Clinical Neuroscience

journal homepage: www.elsevier.com/locate/jocn

Case study

Evaluation and management of small dural tears in primary lumbar spinal decompression and discectomy surgery

Marcelo Galarza [a], Roberto Gazzeri [b,*], Raúl Alfaro [a], Pedro de la Rosa [a], Cinta Arraez [a], Claudio Piqueras [a]

[a] Regional Service of Neurosurgery, "Virgen de la Arrixaca" University Hospital, Murcia, Spain
[b] Department of Neurosurgery, San Giovanni-Addolorata Hospital, Rome, Italy

ARTICLE INFO

Article history:
Received 11 May 2017
Accepted 5 January 2018
Available online xxxx

Keywords:
Dural tear
Spinal
Lumbar spinal stenosis
Herniated disc
Microdiscectomy
Intention to treat
Classification
Tachosil

ABSTRACT

Incidental dural tear is one of the most common intraoperative complications in lumbar spine surgery. Yet, its technical management for the prevention of CSF leak is controversial. The technique of managing dural tears depends on the location of the dural tears as well on the length and anatomical characteristics of the dural tear. We propose an anatomical classification for small (less than one cm) dural tears and report on the outcome of managing these dural tears types using different technique for different type.

62 patients underwent spinal dural repair after microdiscectomy or lumbar spinal decompression. Group 1 consisted of 20 patients, with Type I or mild dural tear who had tissue-glue coated collagen sponge or fibrin glue application. Group 2 comprised 21 patients with Type II or moderate dural tear who had both tissue-glue coated collagen sponge and fibrin glue application. Group 3 comprised 21 patients with Type III or severe dural tear who had polypropylene suture and tissue-glue coated collagen sponge and/or fibrin glue application. Evident postoperative CSF leak was used to determine the patient's postoperative result. Postoperative CSF leak was not evident during a minimum 1 year follow up in group 1. Internal CSF leak was evident in group 2 (n = 3) and group 3 (n = 3) during same follow up. Three patients underwent re-do spinal surgery for CSF leak repair. We recommend different management technique depending on the type of tear. For type I, we recommend the use of tissue-glue coated collagen sponge or fibrin glue application, without dural suturing.

© 2018 Elsevier Ltd. All rights reserved.

1. Introduction

Spinal dural tear is a relatively common situation in every day lumbar procedures. Previous studies have shown that potentially serious problems such as pseudomeningocele, external CSF fistula, meningitis and arachnoiditis with subsequent chronic pain are possible sequalae of dural tears and CSF leakage after spinal surgery [8]. Suture of the spinal dura [1–3], strict bed rest [1,2,4,5], fibrin glue [4,5], and lumbar drainage [3,5,6] have been used to treat intraoperative dural tears to prevent spinal CSF fistula. The morbidity associated with spinal CSF fistula due to primary dural tears accomplished with microsurgery alone [2], or bed rest and spinal lumbar drain insertion have been minimal [5–7]. For cases of dural tears located at the nerve root shoulder, or axilla, however, these treatment options are less appealing because they are associated with a higher morbidity rate. Oversewing the wound with a running locked suture can sometimes stop an external minor leak in a relatively healthy patient. Lumbar drainage system and blood patch have also been used for this situation [8]. The success rates associated with every technique are variable, depending on the patient and the spinal procedure itself [9,10]. The early CSF fistula rates associated with the complete closure of intraoperative dural tears, accomplished using suture, lumbar drain or closed suction wound drainage are 3 and 7%, respectively [3,11,12]. Strömqvist et al. [13] reported an overall incidence of peroperative dural lesion of 7.4%, with a rate of 8.5% in patients undergoing decompressive surgery alone. Unfortunately, information about selection for treatment from the entire case series available and the corresponding outcome of subgroups that were treated is not reported. In the current literature on the treatment of spinal dural tears, there is no grading system used to compare outcomes of different treatments, and to predict the associated rates of morbidity. The outcome of dural tear management, however, is based on CSF fistulas rates from studies of different types of spinal procedures [1–3,5–7,9,11,13–15]. The lack of consensus in the literature and the potentially serious nature of this complication prompted us to further evaluate its management. Actual size of the lesion, as well as location of the tear, which is often the most important factor, can determine the

* Corresponding author at: Department of Neurosurgery, San Giovanni Addolorata Hospital, Via Amba Aradam 9, 00184 Rome, Italy.
E-mail address: rgazzeri@hsangiovanni.roma.it (R. Gazzeri).

https://doi.org/10.1016/j.jocn.2018.01.008
0967-5868/© 2018 Elsevier Ltd. All rights reserved.

Please cite this article in press as: Galarza M et al. Evaluation and management of small dural tears in primary lumbar spinal decompression and discectomy surgery. J Clin Neurosci (2018), https://doi.org/10.1016/j.jocn.2018.01.008

surgical technique for dural repair and the time of the procedure. Nonetheless, in our opinion, when dealing with relatively small dural tears, located at the nerve root shoulder, axilla or in the proximity of the dorsal surface of the dural sac, different repair techniques may be used in relation to the specific anatomical type and characteristics of the dural tear. Accordingly, we propose an anatomical classification for dural tear and report the outcome of distinct anatomical types of dural tears using different techniques.

2. Material and methods

A series of patients undergoing elective spinal surgery for lumbar herniated disc or spinal stenosis were retrospectively reviewed. The types of tears were decided before the onset of the study and were clearly noted by the operating surgeon and reported in the operative note. All patients did not have previous lumbar surgery. Surgeries included microdiscectomy of the L3-L4 (n = 5), L4-L5 (n = 15) and L5-S1 (n = 22) level. Decompression of the lumbar spine included interlaminar decompression of the L3-L4 (n = 3), L4-L5 (n = 4) and L5-S1 (n = 3), L3-L4 and L4-L5 (n = 4), L4-L5 and L5-S1 (n = 4) levels. Laminectomy of the L5 was done in other two cases.

The intraoperative inclusion criteria for treatment of dural tear was leaking, with persistent or excessive CSF exit from an iatrogenic tear (less than 1 cm in length) of the dural sac, in any location, that was not controlled with standard techniques such as compression with use of cottonoids and when the consideration that these methods were excessively time-consuming or could enlarge the dural tear. The decision on the management technique was made by the operating surgeon, according to his/her experience and the specific anatomical characteristics of the dural tear. The visibility and the potential nerve root damage were also taken in consideration. In all cases, following the dural tear repair, the surgeon confirmed that there was no CSF leak from the dural sac. Patients who had previous surgery, or treated with instrumentation, non degenerative cases (tumors, infection and traumatic patients), and lesions of the dura more than 1 cm in length were excluded from the study.

Group 1 consisted of 20 patients, with Type I or mild dural tear. Type I dural tear consisted of disruption of the dura, with clean borders, minimal or no breach of the arachnoid, and exit of few drops of CSF (Fig. 1). These cases were intraoperatively treated with application of fibrin glue (Tisseel–Baxter) or application of tissue-glue coated collagen sponge (TachoSil-Nycomed-Takeda).

Group 2 included 21 patients with Type II or moderate dural tear. Type II dural tear consisted of disruption of the dura, with clean borders, evident breach of the arachnoid, and exit of multiple drops or a single line of CSF (Fig. 2). In these cases, the technique was application of both tissue-glue coated collagen sponge and fibrin glue.

Group 3 comprised 21 patients with Type III or severe dural tear. Type III dural tear consisted of disruption of the dura, with more than one border, gross breach of the arachnoid sometimes with protrusion of the rootlets or nerve roots, and persistent exit of several lines of CSF (Fig. 3). These cases were treated with polypropylene suture (prolene 5–0) and fibrin glue application and, in cases with persisting leakage after suturing and before fibrin glue application, or with perceived risk of further tearing of the dura with the polypropylene needle, or risk of tearing a nerve root or rootlets, or other anatomical hindrance, the tissue-glue coated collagen sponge was applied (Fig. 4).

The following data were collected and analyzed for all patients: age, sex, diagnosis, location of the dural tear, surgical technique for repairing the dura, anatomical relation of the dural tear and length of the surgery. Given the application of a relatively new product

Fig. 1. Type I dural tear consists of disruption of the dura, with clean borders, minimal or no breach of the arachnoid, and exit of few drops of CSF. These cases were intraoperatively treated with application of fibrin glue or application of tissue-glue coated collagen sponge.

(tissue-glue coated collagen sponge), after surgery, the patients were evaluated for the following assessments: laboratory tests (alkaline phosphatase, blood urea, creatinine, and leukocyte count) [4], neurological examination, adverse events at postoperative day 1, 7, and 1-month follow-up visit. All patients underwent spinal lumbar X-ray on postoperative day 1 and lumbar magnetic resonance at one month follow-up visit (first follow-up visit). Spinal MRI was performed in 5 cases at three, or six-months Follow up according to the patient clinical situation.

The outcome was determined by whether there was internal or external CSF leak on MRI scan.

3. Results

Between March 2013 and October 2014, intraoperative repair of a dural tear was required in 62 consecutive patients during microdiscectomy (n = 42) or lumbar spinal decompression (n = 20). This comprised overall 3.2% of all elective spinal procedures during the same period. 35 were female and 27 were male and their mean age was 48.6 years (range, 27–74 years). In all patients, when brisk CSF leak was encountered coming from a tear of the dural sac, the surgical technique involved the use of standard methods initially (i.e., compression, oxidized cellulose, cottonoid application, gelatin sponge); when these measures failed, were excessively time-consuming (persistent CSF leaking after 2 min), were considered risky, or the dural tear enlarged, the specific surgical method according to the Type of dural tear was applied. Initial size of the tear was not in any case of more than 10 mm. Location of the dural tears included the dorsal surface of the dural sac (n = 18), nerve root shoulder (n = 24) or nerve root axilla

Please cite this article in press as: Galarza M et al. Evaluation and management of small dural tears in primary lumbar spinal decompression and discectomy surgery. J Clin Neurosci (2018), https://doi.org/10.1016/j.jocn.2018.01.008

Download English Version:

https://daneshyari.com/en/article/8685199

Download Persian Version:

https://daneshyari.com/article/8685199

Daneshyari.com