

Management Of Resistant CSF Leak After Lumbar Spine Surgery By None Suction Drain Only (Simple And Cheap Approach In A Developing Country)

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Abstract:

BACKGROUND:

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 problems of dural tears and CSF leakage after spinal surgery [1]. For cases of dural tears located at the nerve root shoulder or axilla however, the direct dural repair with stitches as a treatment options 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 [1]

Objective:

The main object from this study is to assess the simple suturing, valsava maneuver plus the use of the none suction drain for 7 days at least until the skin wound in the lumbar region get about to heal optimally and then it will prevent the further CSF leak again by its own passive counter coup pressure.

Material and Method:

A series of patients underwent lumbar spinal surgery were retrospectively reviewed in multicenteric study in the period between 2017 – 2021. Some types of the tears were iatrogenic, seen, reported in the operative note and others were occult. Appeared after the surgery by hours to days. In addition some patients had previous lumbar surgery. Surgeries included 116 patients. Each type of the surgery in the lumbar spine was mentioned. All wounds were managed by the same dressing material and the dura was closed in the same simple sutures fashion using vicryl 0/4 round needle. The drain was put in all cases in the subfacial space and in a none suction state. Management against low tension headache was initiated. Complete bed rest was applied. Finally the follow up period was about one month after surgery.

Results:

Among total of 116 cases CSF leak occurred in 18 cases which represent 15.5% of the total number of surgeries included in the study. in the early 3 days after the surgery and appeared in the drain. The period between primary surgery and the diagnosis of CSF leak was an average of (Mean 2 days) (range 1 – 3 days) after surgery. Discectomy in 45 cases and post operative leak occurred in 4 . Decompression laminectomy of the lumbar spine included in 53 and the post operative leak occurred in 7 cases. Recurrent lumbar disc surgery were 12 cases and the post operative leak occurred in 5 cases. Meningocele was done in other 6 and the post operative leak occurred in 2 cases.

Conclusions:

Although the incidence of the CSF leak after dural tear with spinal surgery is not high, caution must be taken in mind not to progress to fistula or infective meningitis. Also, not to remove the submuscular drain early as usual but to keep it in place to help in skin wound healing. Finally, the recurrent surgery carries a high risk of dural tear that indicated preoperative availability of graft or sealant like fibrin glue.

Keywords: Management, resistant CSF leak, lumbar spine surgery, none suction drain.

Introduction

Dural tears are most common to occur in the lower lumbar region being the most common site for surgeries. (6,7) factors that may predispose to dural tears like thinned dura, prior spinal surgery, dural fibrosis, spinal stenosis, and spinal bifida. (8,9) plus ossifications of spinal ligament, high-speed drill, and synovial cysts have been associated with dural tears. (9,10) other causes like trauma, disc fragments, bone spikes, excessive dural traction and iatrogenic laceration by sharp instruments or intradural explorations can lead to dural tears with its complications.(8,11). Symptoms related to intracranial hypotension can be the first to appear due to tension on the meninges like postural headache, radiculopathy and vomiting and sometimes photophobia, dizziness or cranial nerve palsies can be recognized.

First when suspecting a CSF leak we should inspect the wound to search for clear discharge coming out or a halo sign found in the patient dressing or clothes. If this fluid was analyzed B2-transferrin—a polypeptide that is highly sensitive to CSF can be found. (1, 3, 6).

Magnetic resonance imaging can be used to differentiate between CSF and seroma fluid and to identify the site and extent of the lesion. CSF is hypointense on T1-weighted images and hyperintense on T2-weighted images.

Methods and materials

Early detection of CSF leak was common in our study and occurs either intraoperatively in 98 cases or in early 4 days postoperatively in 18 cases. An unintended durotomy occurred intraoperatively that was readily identified afforded primary repair and intraoperative testing through a valsalva maneuver.

Direct primary suture repair was done using 0/4 Vicryl continuous suture, valsalva testing by the anaesthesia doctor after that to secure our sutures. Water tight fashion for the fascia and skin was done. A sub muscular drain 14G was always put. The drain was applied not under suction from the first day in the repaired dura and on the day of diagnosis in the other cases that were identified in the next days. All the skin wound was examined every two days for redness, swelling or leak. The drain was left for 7 days to maintain normal pressure under the wound and permit good healing process without leak or gapping of the wound sutures.

After removal of the drain the hole of it was left as a potential space for residual leak not to push against the wound. After 2 – 3 days the drain opening was closing spontaneously although some fluid comes from it in the first two days after removal.

The majority of the cases complained from postural headache and neck pain. All the patients were advised for complete bed rest and avoid prolonged lying on the back.

Good fluid intake, broad spectrum IV - antibiotics for both gram ve+ and ve- bacteria in addition to acetazolamide were given.

All the patients skin wound healed without CSF leak at the end of the first two weeks after the surgery and also in the visit after a month from the surgery.

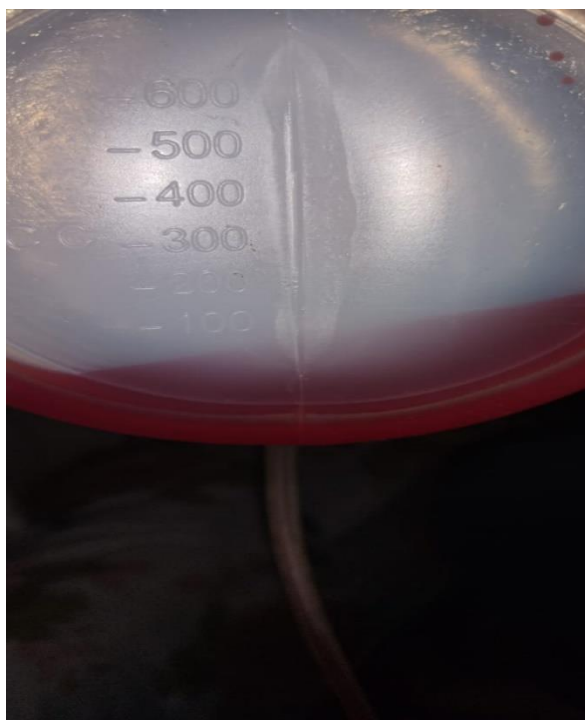




Fig. 1 suction drain in the day of surgery about 80 cc showing the content and the next day is much lesser than the previous day and can be removed.



Fig. 2 : Showing the wound in the third day after drain removal while no leak.



Fig3: Showing pure CSF leak with the same amount every day for three days after the surgery.



Fig. 4: Shows the wound with mild swelling after removal of the drain on the day No. 7 after the surgery and no wound leak.

Results:

Cerebrospinal fluid leak after spinal surgery is one of the most common complications that could happen that if properly managed would have no bad impact on the patient.

In this study we tried to outline the exact percentage around which leakage is expected in such surgeries and to outline the most common complications expected to happen so that to be prepared to face them and to try to make the patient aware for their occurrence.

In this study we tried primary repair for the dura intraoperative using simple sutures then we used a none suction drain for 7 days until the skin wound get to heal optimally and then no risk of wound cerebrospinal fluid leak would appear.

Among total of 116 cases CSF leak occurred in 18 cases which represent 15.5% of the total number of surgeries included in the study.(Figure 1)

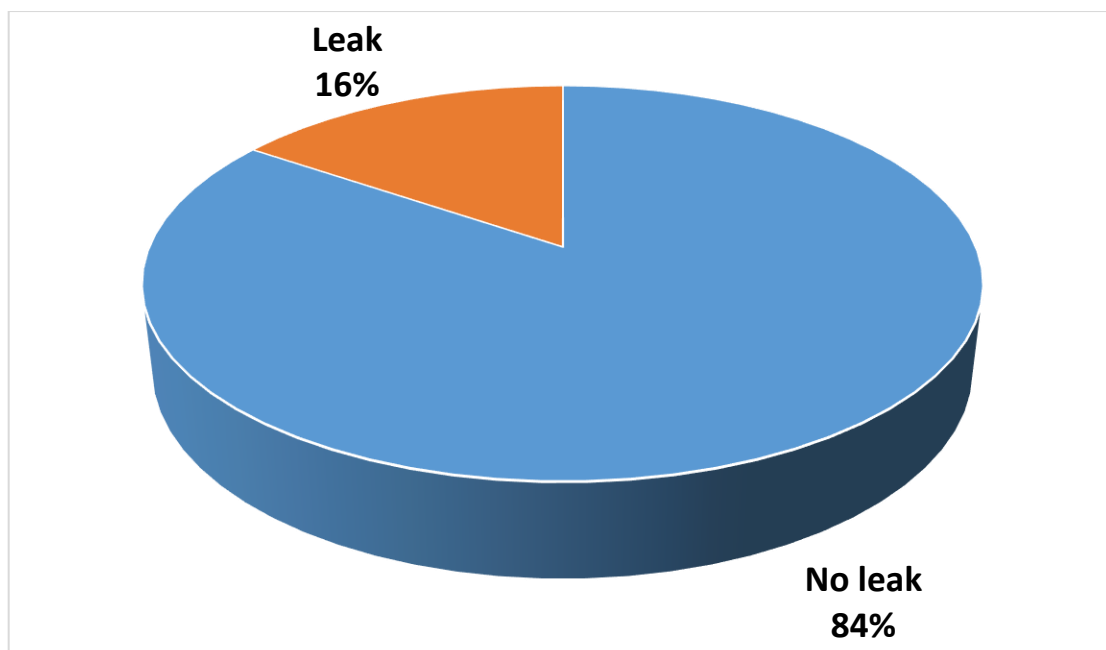


Figure (1): Percentage of post-operatively detected leak in the study sample

Among the 116 cases included in our study 45 cases (38.8%) were fresh cases of discectomy, 53 cases (45.7) were laminectomy surgeries, 6 cases (5.2 %) of meningocele and 12 (10.3%) cases of recurrent lumbar surgeries.(Figure 2)

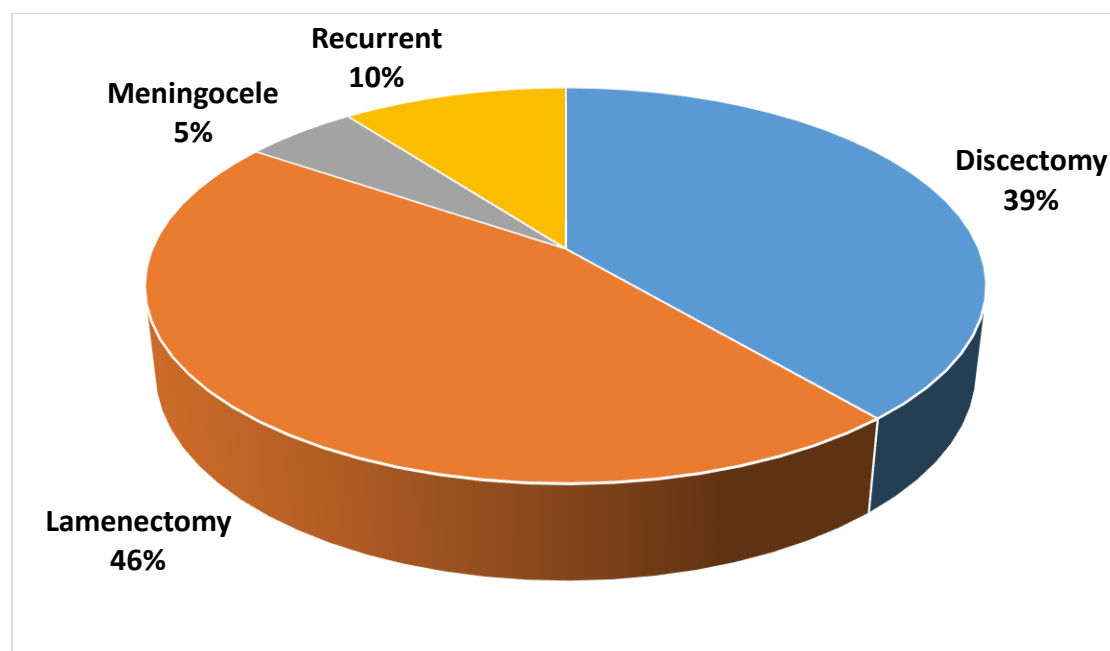


Figure (2): Type of surgery in the study sample

Time leak in this study varied from 9 cases in the first day and 7 cases in the second day and only 2 cases were detected in day 3. (figure 3).

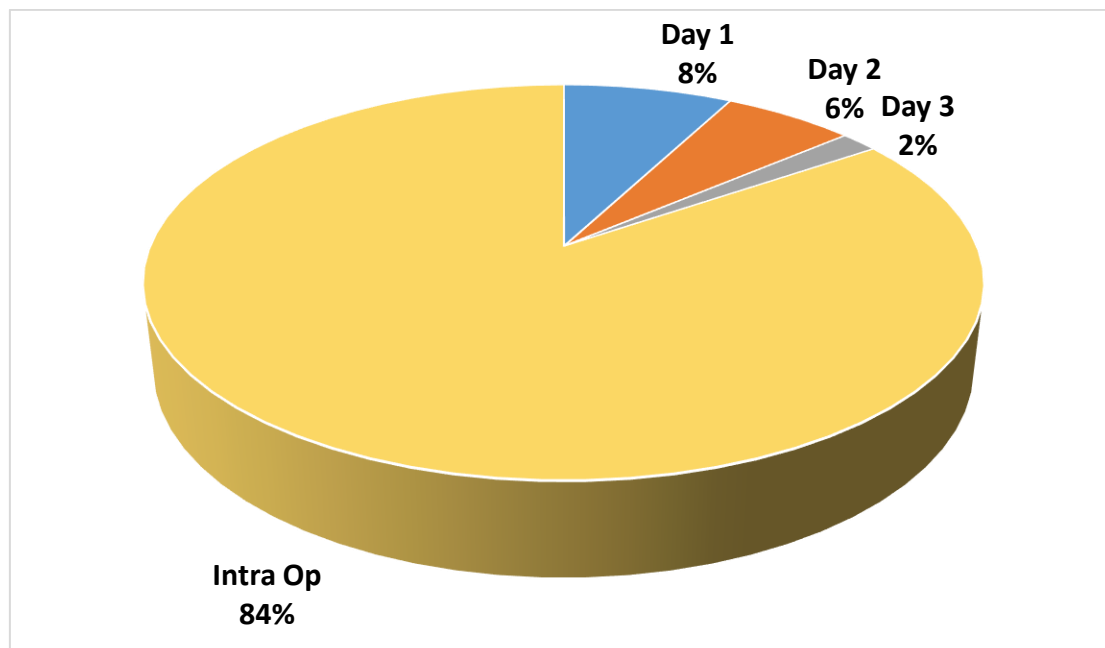


Figure (3): Time of leak detection in the study sample

Certain complications were observed and traced to see their impact on the patients and to be prepared during post operative periods to this events. Most common

complication to occur was headache in 77% of cases followed by neck pain in 50% of cases then followed by neck rigidity in 27.8% and lately fever in 16.7% of cases. Zero cases were to be complicated by fits , motor affection, sensory affection or sphincteric affection. (figure 4).

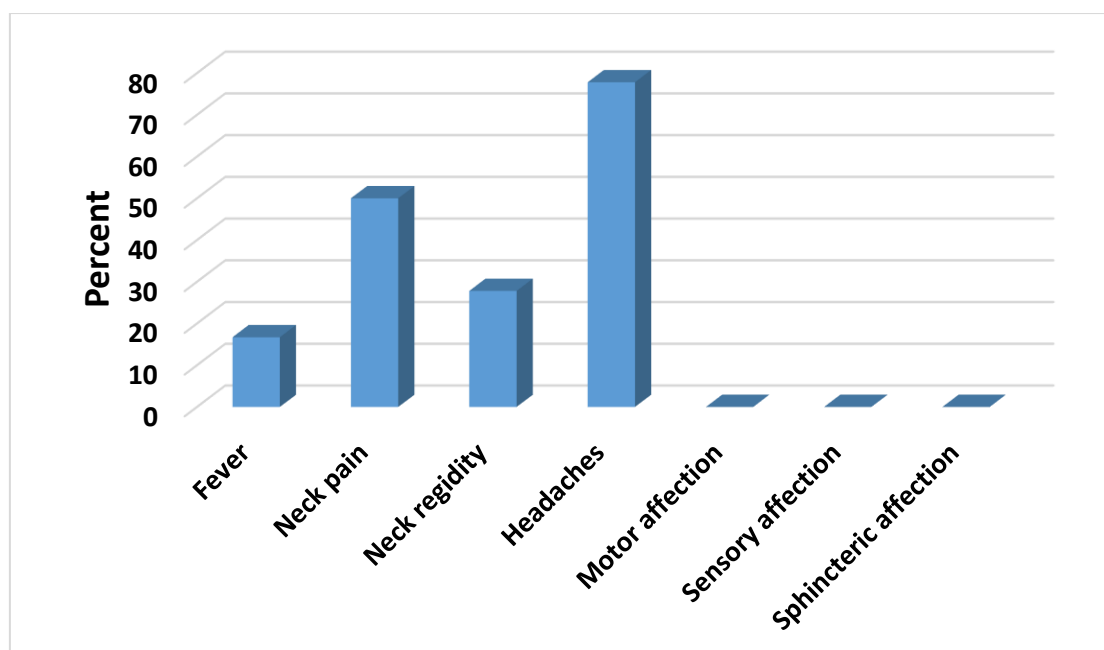


Figure (4): Distribution of complications (percents)

Finally while using the technique of leaving none suction drain for 7 days until the skin wound get to heal optimally we experienced zero cases of wound leaking CSF.

Discussion:

Proper management of cerebrospinal fluid leakage following lumbar surgery is a challenging subject for such a common complication, that if properly dealt with could avoid lots of complications to the patient and also decrease expenses spent on such complications such as the cost of going to second repair surgery.

In our study the incidence of dural tears was 16% of the cases operated upon whether the operation was for the first time or recurrent. In other literatures there is a very wide range of dural tears ranging from 1.5% to 18% (12,13,14). However most of these dural tears are detected intraoperative and managed accordingly either by direct suturing or by applying a fat graft. In other cases leak is only discovered postoperatively either from presence of cerebrospinal fluid in the drain or coming through skin sutures or sometimes from the patient complaint as low tension headache or neck pain and so this is called delayed CSF leakage (15,16). In our study diagnosis of the presence of CSF leak depended on the presence of CSF in the suction drain postoperatively either to be expected and searched for in case of the tear in noticed intraoperative or just noticed from the patient complaint postoperative. But in no cases imaging was required to ease the diagnosis as CSF was always present in the drain. However Johnson DB et al. reported that MRI was very reliable in

identifying the presence and location of CSF leakages in patients with CSF fistulae (17) but we could not agree with this assumed importance. Fear of dural tears comes from the fact that these tears can lead to really lethal outcome scenarios to the patient like brain subdural hematoma or meningitis (16), however in our study with the presence of suction drains our patients mainly experienced for the majority of them headache followed by neck stiffness then fever in few of them with no signs of motor or sensory affection or fits.

Finally dural tears once noticed must be dealt with as efficient as we can first by primary closure then if not applicable with fibrin glue or application of fat graft, however in all cases presence of a nonsuction drain is a good guarantee that there will be no CSF leak through the wound till the it is properly closed which will lead to no readmissions or re operations so definitely decreasing the total cost spent.

Conclusion:

Although the incidence of the CSF leak after dural tear with spinal surgery is not high, caution must be taken in mind not to progress to fistula or infective meningitis. Also, not to remove the submuscular drain early as usual but to keep it in place to help in skin wound healing. Finally, the recurrent surgery carries a high risk of dural tear that indicated preoperative availability of graft or sealant like fibrin glue.

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