

Case study and thoraco-lumbar CSF drainage

By Pat Mercer-Deadman, RN, ENC(C)

Mr. D. is a 78-year-old farmer from rural Alberta, who presented to the emergency department (ED) Wednesday, March 30, 2016, with mid thoracic/scapular pain that began suddenly while he was out doing chores. The pain is severe and unrelenting. He developed transient paralysis of both legs, but, on occasion, just the left leg. These episodes of paralysis came and went approximately every 15 minutes and lasted 5–10 minutes. There was no impairment of sensation. Mr. D. has a known 5 cm abdominal aortic aneurysm (AAA) and he is brought to the Grey Nuns ED. The Grey Nuns in Edmonton is the vascular centre for northern Alberta. Other than the known AAA, Mr. D is healthy, has no history of hypertension and does not take any medications. He quit smoking approximately 30 years ago.

Mr. D. described his pain as 5/10, which was not substantially relieved with three doses of Morphine 2.5 mg IV.

On CT-angio, a dissection of his aorta was seen, extending from his left subclavian all the way down to his abdominal aortic aneurysm. This was classified as a Crawford II, with dissection and bleeding between the walls of the aorta. The doctor told Mr. D. that this was *not* repairable by surgical intervention. The doctor advised the patient that based on this, he would have an Anesthesiologist come and insert a thoraco-lumbar cerebral spinal fluid (CSF) drain to relieve the increased pressure on the spinal cord that was being caused by the dissection. The paralysis is caused by ischemia to the spinal cord. By draining off some CSF, there would be additional space for the spinal cord and circulation to it would be improved (Cheung, 2013).

At the Grey Nuns ED, the Anesthesiologist inserts this drain and brings all the necessary equipment including the “kit” with the manometer and monitoring tubing and cable. The Anesthesiologist requires assistance by the ED staff and supplies for this procedure including hats, gowns, masks and gloves and possibly the chlorhexidine swabs. This CSF drain must be inserted under strict aseptic conditions (Federow et al., 2010).

A 14-gauge needle is most often used to insert the Silastic® catheter to drain the CSF and is usually put in through the L3-L4 or L4-5 space and threaded up to the T12-L1 space. For insertion, the patient is in the same position as for a lumbar puncture, either lateral decubitus with knees flexed to the chest and chin down, or the patient is sitting up leaning over an over bed table with the back bowed outward. Once the catheter is in place, it is sutured in and a three-way stopcock is attached with the tubing and manometer. The insertion site is covered with a sterile clear

occlusive dressing. The tubing is either primed retrograde with the patient’s own CSF or with sterile preservative-free normal saline. This tubing must be clearly labelled with a “No Injections” label. A pressure bag or heparin must *never* be used for this procedure. There may be a sterile bag attached or the system closed with sterile caps. A set amount of CSF is decided upon and removed by the physician. The patient with a CSF drain is ideally monitored in an ICU for close observation of the CSF pressure and the patient’s blood pressure. The CSF monitor is “zeroed” and the transducer is kept at the phlebostatic axis (level with the right atrium). This is important, as the patient is usually positioned with the head of the bed elevated, but not more than 30 degrees. Usual CSF pressure parameters are 10–12mmHg. However, during this procedure, CSF pressure is to be kept below 15 mmHg (Federow et al., 2010). The patient’s blood pressure (BP) is monitored carefully to maintain a mean arterial pressure (MAP) of greater than 80 mmHg with consideration of the reason for the drain. The aim is to maintain the patient with normal blood pressure. Monitoring of the CSF pressure is continuous and the removal of CSF is usually intermittent (Cheung, 2013).

There are risks with this procedure: meningitis, fistulation, epidural hematoma, subarachnoid hemorrhage and possibly uncal herniation if too much CSF is removed too quickly. Headache is a common side effect. The literature suggests that no more than 10–15 ml of CSF be removed in any one-hour period (Federow et al., 2010).

Contraindications for the thoraco-lumbar CSF drain are: trauma, active infection, aortic rupture, pre-existing paraplegia, or past spinal surgery.

These drains are sometimes used with elective repair of thoracic aortic aneurysms and are inserted usually one day preoperatively. These drains may also be used for the treatment of post-operative or traumatic dura fistula with a CSF leak, diagnostic tests for hydrocephalus, to decrease intracranial pressure (ICP) with craniotomies, and as adjunct therapy in the management of traumatically brain-injured patients (Federow et al., 2010).

Documentation is, as with any other procedure, making note of the amount and description of the CSF, and the patient’s condition during and after the procedure.

Neurovital signs are monitored and documented at least hourly with particular attention to limb strength and movement if done to relieve pressure on the spinal cord.


The CSF drain is usually removed after approximately 72 hours, may be left longer in certain instances, but never more than five days due to potential infection.

The thoraco-lumbar drain is removed by the Anesthesiologist or a specially trained ICU nurse. The patient’s clotting times are checked prior to removal. The patient should be positioned as for the insertion (this increases the space between the vertebrae,

making withdrawal easier) and the catheter is removed with a steady constant withdrawal. The tip of the catheter is visualized and charted “tip intact”, as with the removal of an arterial line (American Association of Neuroscience Nurses, 2011).

Now back to Mr. D:

The Anesthesiologist removed 12 ml of CSF and the patient was admitted to ICU where he was attached to the CSF monitor. He was kept in ICU for three days at which time he had no recurrence of the paralysis and his pain had subsided. Mr. D. was kept on the ward for an additional 2–3 days at which time beta blockers were administered to lower his BP. This resulted in syncope, as he was not previously hypertensive. Therefore, the medication was discontinued. Mr. D was discharged and resumed his normal activities.

In mid-May, the doctor scheduled Mr. D. for a follow-up CT-angiogram, which showed no furthering of the dissection and no recurrence of his symptoms. He still has the 5 cm AAA, which will be monitored by CT scan approximately every six months for future elective repair. 

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About the author

Pat Mercer-Deadman has been an emergency nurse since 1983 and has her emergency nursing certification through the Canadian Nurses Association since 1999. Pat works on a casual basis in emergency and has a part-time position in the recovery room at the Grey Nuns in Edmonton, Alberta. It is here that she has developed a special interest in aortic vascular patients. She has developed a presentation on Abdominal Aortic Aneurysms, Dissections and Ruptures in the Emergency Department and has presented this both locally and nationally. This presentation was published in the Canadian Journal of Emergency Nursing (CJEN) Spring 2014.

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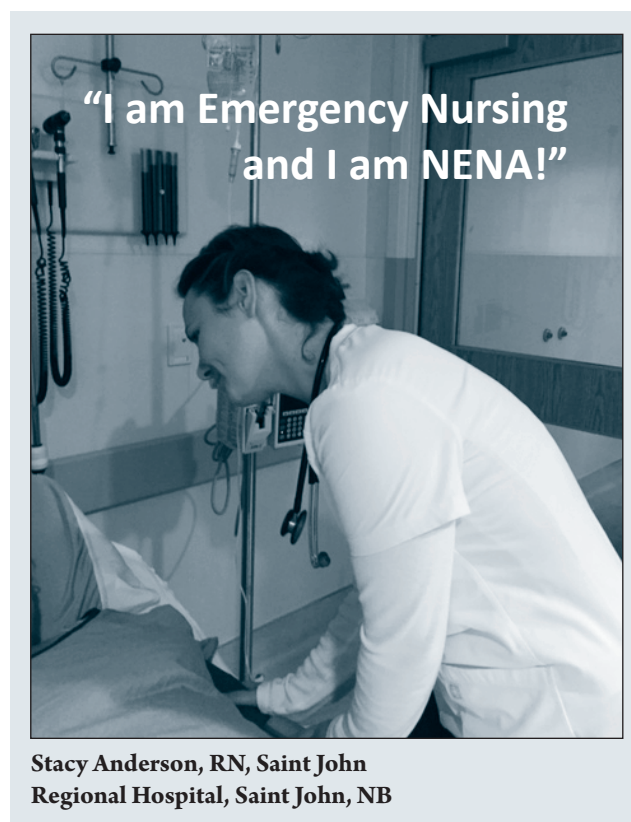
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