Cerebrospinal fluid rhinorrhoea following nasal packing for epistaxis: case series from a single centre

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Epistaxis is one of the most common ear, nose and throat (ENT) emergencies, the majority of which are due to bleeding from an anterior site that can be managed with simple cautery measures. Packing the nose is reserved for recalcitrant bleeding or for bleeding from a posterior site that cannot be accessed. There is a trend towards immediate packing of the nose by first responders and emergency physicians with one of two commonly used nasal packing/tamponade devices in New Zealand: Rapid Rhino (Smith & Nephew plc, Watford, England) and Merocel (Medtronic, Mystic, Conneticut, USA).

In recent years our department has encountered three cases of traumatic cerebrospinal fluid (CSF) rhinorrhea following premature use of Rapid Rhino nasal packing devices for spontaneous anterior epistaxis.

Cases

Case one: A medically frail, 85-year-old female presented with spontaneous right-sided epistaxis that progressed to bilateral bleeding. She had bilateral nasal packs placed by first responders in the community. These were noted to be sitting vertically and partially out of the nares, with severe pain experienced during insertion and a persisting headache.

Following removal, rhinoscopy showed nasal mucosal tearing from the nasal septum with an anterior bleeding site, followed by continuous bilateral *rosé*-coloured rhinorrhea. This tested positive for beta-2 (tau) transferrin. CT sinus series did not convincingly demonstrate any fractures.

She remained under observation without further active management or nasal packing, with spontaneous resolution of headache and rhinorrhea at three weeks follow-up.

Case two: A 61-year-old woman, who required anticoagulation for metallic replacement heart valve, presented with right-sided epistaxis. Upon admission to the emergency department a Rapid Rhino was placed. The pack was removed and no specific bleeding point was identified, only damaged mucosal ooze. NasoPore (Stryker, Kalamazoo, Michigan, USA) was placed over the mucosal tears for non-compressive pro-coagulant effects. NasoPore is a soft and absorbable porous packing material that assists in achieving tamponade without firm pressure. It is often placed after endoscopic nasal examination and allows the addition of further topical medication, such as tranexamic acid. It is not recommended as an alternative product to use in the initial management of epistaxis. Bleeding restarted on the contralateral (left) side during admission requiring insertion of Rapid Rhino pack in the left nostril. This was removed successfully, and further NasoPore was placed. The patient developed haemoserous rhinorrhea on the right side that tested positive for beta-2 (tau) transferrin. CT imaging did not identify any skull base defects. The patient was given prophylactic antibiotics as she had foreign material (NasoPore) in the nose and was observed with resolution of rhinorrhoea within fourteen days.

Case three: A 56-year-old man with a background of well-controlled hypertension presented with a first episode of spontaneous unilateral epistaxis. On transfer from a peripheral emergency department he

ISSN 1175-8716

had a Rapid Rhino nasal pack in situ and reported intense pain during its insertion. This was removed and cautery was performed to the anterior bleeding point. He developed ipsilateral clear rhinorrhea that persisted and was positive for beta-2 (tau) transferrin.

CT sinuses showed a possible disruption in the cribriform plate, so neurosurgical opinion was sought and surgical exploration was recommended. He proceeded to have an ipsilateral comprehensive functional endoscopic sinus surgery, partial middle-turbinate resection and exploration of anterior skull base. No obvious leak was found. Gelatin sponge pieces were applied to the posterior olfactory cleft at the middle-turbinate attachment point, because a subtle defect was suspected in this region due to previous displacement of the middle turbinate.

The CSF rhinorrhea ceased over the following two days, a total of seven days after the onset.

A follow-up CT-myelogram demonstrated no further leak and the patient remained symptom free at a clinic follow-up four months later.

Discussion

Nasal packing systems are more commonly placed by first aid providers, including paramedics and emergency medical officers in emergency settings, rather than ENT specialists.[1,2] While they can be a useful adjunct in the management of epistaxis, they are not without their risks; the most notable complication is intense pain at the time of insertion.[3] Watery rhinorrhea is also commonly reported, but confirmed CSF rhinorrhea is limited to case studies and series.[1,2,4]

Trauma to the skull base can occur by inserting the device in the wrong direction and displacing the middle turbinate that is attached to the skull base. Manufacturer instructions are clear. Devices should always be inserted horizontally in the direction of the floor of the nose, and insertion without adequate training is not recommended.[6] Figure 1 demonstrates the technique of inserting the Rapid Rhino device. The minimum equipment needed is a headlight, personal protective equipment and saline to thoroughly soak the Rapid Rhino prior to insertion. By elevating the anterior nares with one hand, the clinician can view the anterior nose and septum and ensure safe insertion along the floor of the nose (Figure 2).

If CSF leak is suspected, a fluid sample should undergo electrophoresis testing for the presence of beta-2 (tau) transferrin.[7] Antibiotics are not routinely recommended as prophylaxis and resolution usually occurs with bed rest and observation.[1,2]

Recommendations

It has been our experience that Rapid Rhino packs are being used frequently without identification and treatment attempts to the bleeding sites. Our department is actively engaging with primary response and first-aid providers through education and training sessions alongside the device manufacturers about

Figure 1: The patient is positioned upright but comfortable (approximately 45 degrees head elevation). Physician is wearing personal protective equipment to avoid blood spray while performing anterior rhinoscopy and planning insertion of nasal packing device.

NZMJ 30 April 2021, Vol 134 No 1534
ISSN 1175-8716
www.nzma.org.nz/journal

the appropriate use of these devices in addition to the initial management of epistaxis.

Specific advice is being given regarding early involvement of ENT services to prevent unnecessary insertion, or if insertion is necessary, to ensure they are inserted in the appropriate direction with the appropriate amount of force and inflation. Of course, if treatment of the bleeding site is not possible or fails, and if temporising measures such as topical adrenaline on gauze or cotton wool are unsuccessful, a relatively firm nasal pack can be placed, but the correct technique is essential, as these cases demonstrate.

Our department recommends discussion with local ENT services prior to nasal packing device insertions in the absence of life-threatening haemorrhage.

Competing interests:
Nil.

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URL:
www.nzma.org.nz/journal-articles/cerebrospinal-fluid-rhinorrhoea-following-nasal-packing-for-epistaxis-case-series-from-a-single-centre

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