Endoscopic balloon sinuplasty for frontal sinusitis in hereditary haemorrhagic telangiectasia

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Abstract

We describe a novel use of endoscopic balloon sinuplasty to treat isolated frontal sinusitis in a patient with a large burden of intranasal telangiectasia with a history of hereditary haemorrhagic telangiectasia

Key Points:

1. Patients with hereditary haemorrhagic telangiectasia (HHT) often experience intractable episodes of epistaxis due to intranasal telangiectasia
2. There is no existing literature on surgical treatment for rhinosinusitis in patients with HHT
3. Endoscopic balloon sinuplasty has been shown to be a safe, minimally invasive surgical approach to sinusitis
4. We show that endoscopic balloon sinuplasty can be safely performed in a patient with HHT
5. This technique can be combined with other endoscopic treatment for epistaxis, such as laser or conventional diathermy coagulation

Introduction:

Hereditary haemorrhagic telangiectasia (HHT) is an autosomal dominant disorder of angiodysplasia characterized by mucocutaneous telangiectasia, recurrent epistaxis and arteriovenous malformations. (1) Most commonly patients present with epistaxis due to intranasal telangiectasia; however telangiectasia can also occur in the skin, gastrointestinal and oral mucosa and arteriovenous malformations (AVM) can occur in the liver, lungs and brain. (1) Patients with HHT are at increased risk of bleeding during endoscopic sinus surgery. (2) Balloon sinuplasty is a less invasive technique compared to traditional endoscopic sinus surgery. (3) We report the use of balloon sinuplasty to treat chronic frontal sinusitis in a man with HHT and a previous frontal lobe abscess.

Objectives:

To demonstrate the safety and efficacy of endoscopic balloon sinuplasty in the treatment of frontal sinusitis in a patient with HHT.

Methods:

A retrospective case report was performed and all data was obtained from the routine care of the patient.

Ethics:

Institutional or ethical board review was not sought for this case report. Written informed consent was obtained from the participant of the study. All patient data has been checked and de-identified prior to submission. Reporting guidelines: This case report utilizes the CARE guidelines for case reports. (6)

Results:

A 41 year old man with a diagnosis of HHT was referred to a tertiary referral rhinology clinic after an emergency admission with a right frontal lobe abscess which had been drained via a right temperoparietal craniotomy. A 10.7 x 10.6 x 3.1 cm left lingula pulmonary AVM (PAVM) was diagnosed during that admission and successfully embolized with an AMPLATZER Vascular Plug (St. Jude Medical, Plymouth, Minnesota, USA). Isolated opacification of his right frontal sinus was also identified on serial magnetic resonance imaging (MRI) scans but there was no bony erosion of the posterior table (Fig 1). It was not possible to determine whether the PAVM or frontal sinus disease was responsible for the frontal lobe abscess.

The patient reported recurrent epistaxis and crusting since childhood but had never sought treatment for this. He denied all other nasal symptoms, including prior to/during his admission. Examination revealed multiple intranasal telangiectasia, septal deviation to the left and a bulky right middle turbinate. There was no evidence of acute or chronic sinusitis with no pus, oedema or polyps seen. CT sinuses confirmed an isolated right frontal sinus opacification with opacification of the frontal recess and an opacified mucous filled right middle turbinate concha bullosa (Fig 2).

Treatment options were discussed with the patient. Given his lack of symptoms and the potential bleeding risk associated with any intervention, conservative management was trialled initially. At one year there was no change to the persistent right frontal sinus opacification. At that review, he revealed his epistaxis was beginning to affect his quality of life. Management options were again discussed with the patient and he opted for endoscopic potassium titanyl phosphate (KTP) laser ablation for his epistaxis. At the same time, he was offered endoscopic balloon sinuplasty to treat his chronic frontal sinusitis, as a potentially less traumatic option than traditional endoscopic sinus surgery. As a precaution he was also consented for both endoscopic and external approaches to the right frontal sinus.

The patient was anaesthetized using total intravenous anaesthesia to optimize blood pressure control. He was intubated with an oral RAE tube and positioned supine in a reverse Trendelenburg position. The nose was prepared with a modified Moffett's solution containing 100mg of cocaine, 1mg of adrenaline and 8mL of normal saline topically for vasoconstriction. A zero-degree 2.7mm endoscope was used. The right concha bullosa was reduced laterally for access to the frontal recess. Thick retained mucous and polypoid tissue was debrided from the exposed frontal recess in the middle meatus. A 6mm NuVent frontal sinus balloon (Medtronic, Fridley, Minnesota, USA) was placed into the frontal recess under direct vision and dilated for 3 seconds. Frank mucopus was irrigated from the frontal sinus following removal of the balloon and irrigation. Patency of the frontal recess was confirmed with 30-degree and 70-degree endoscopes (Fig 3) (Supplemental annotated video). Bilateral endoscopic KTP laser ablation of the nasal telangiectasia was then performed using a standard technique (4). There was no significant bleeding during the procedure. The patient was extubated in recovery and discharged home the same day. He did not suffer any immediate or delayed post-operative complications.

After one month he had not had any significant episodes of epistaxis. Careful flexible endoscopy confirmed patency of the right frontal recess and no mucopus was seen. Repeat MRI at six months revealed a clear right frontal sinus with no residual opacification (Fig 4). He was reviewed in clinic at one year post-operatively due to recurrence of his epistaxis, albeit at a lesser frequency and severity. He was booked for another KTP laser procedure.

Discussion:

Hereditary haemorrhagic telangiectasia (HHT) is not a risk factor for acute or chronic rhinosinusitis, however it is a difficult problem to treat in these patients. Routine endoscopic sinus surgery is complicated by the presence of intranasal telangiectasia which, if traumatised, can cause life threatening bleeding, impair visualization of the surgical field and increase the risk of intra-operative complications. (5) Balloon sinuplasty is a minimally invasive technique for the treatment of chronic rhinosinusitis without polyposis which can even be used in the outpatient setting. (3) With adequate topical decongestion and vascoconstriction, the frontal ostium can be catheterized without the need for endoscopic access or ablative surgery. At the time of

the procedure, any symptomatic telangiectasia can be treated with KTP laser ablation or cautery. Here we demonstrate its efficacy in treating isolated frontal sinus disease in a patient with a large intranasal burden of telangiectasia. Careful endoscopic balloon sinuplasty allowed atraumatic visualization and instrumentation of the frontal recess. The ostium was widened to allow intraoperative irrigation of the mucopus retained within the sinus and the frontal sinus remained patent six months following surgery on a repeat MRI scan. This minimally invasive technique also avoided the need for intranasal packing post-operatively and reduced the risk of trauma to the anterior nasal mucosa. Whilst traditional endoscopic surgical techniques were required to help deploy the balloon, widening of the ostia and decompression of the sinus was achieved with the balloon sinuplasty device.

Conclusion:

To our knowledge this is the first reported case of balloon sinuplasty in a patient with HHT. Traditional sinus surgery is generally avoided in this group if possible, given the potential risk of significant intraoperative bleeding. In practice, this technique may be transferrable to the treatment of maxillary sinus disease in patients with HHT.

References:

1. Li S, Wang SJ, Zhao YQ. Clinical features and treatment of hereditary hemorrhagic telangiectasia. Medicine (Baltimore). 2018 Aug; 97(31):e11687 doi: 10.1097/MD. 0000000000011687.
2. Stankiewicz JA, Lal D, Connor M, Welch K. Complications in endoscopic sinus surgery for chronic rhinosinusitis: a 25-year experience. Laryngoscope. 2011 Dec; 121(12):2684-701. doi: 10.1002/lary.21446. Epub 2011 Nov 15.
3. Ahmed J, Pal S, Hopkins C, Jayaraj S. Functional endoscopic balloon dilation of sinus ostia for chronic rhinosinusitis. Cochrane Database Syst Rev. 2011 Jul; 6(7):CD008515. doi: 10.1002/14651858.CD008515.pub2.
4. Harvey RJ, Kanagalingam J, Lund VJ. The impact of septodermoplasty and potassium-titanyl-phosphate (KTP) laser therapy in the treatment of hereditary hemorrhagic telangiectasia-related epistaxis. Am J Rhinol. 2008 Mar-Apr; 22(2):182-7. doi: 10.2500/ajr.2008.22.3145.
5. Khanna A, Sama A. Managing complications and revisions in sinus surgery. Curr Otorhinolaryngol Rep. 2019; 7:79. doi: 10.1007/s40136-019-00231-3.
6. Riley DS, Barber MS et al. CARE guidelines for case reports: explanation and elaboration document. J Clin Epidemiol. 2017 May 18. pii: S0895-4356(17)30037-9. doi: 10.1016/j.jclinepi.2017.04.026.

Figure 1 – Magnetic Resonance Imaging (MRI) findings of right frontal sinus opacification (arrow head) pre-operatively and an opacified right middle turbinate concha bullosa (arrow)

Figure 2 – Computed Tomography (CT) demonstrating right frontal sinus and frontal recess (arrow head) opacification with obstruction of the frontal recess by a concha bullosa of the middle turbinate (arrow) without evidence of pansinusitis

Figure 3 – 70 degree endoscopic view intra-operatively confirming patency of the right frontal ostium following balloon sinuplasty

Figure 4 – Post-operative MRI confirming a patent right frontal recess (arrow head) six month following balloon sinuplasty