Role of Balloon Sinuplasty in the Treatment of Frontal Sinusitis

Abdulaziz Bazuhair, MD* Arwa Alawadhi, MBBCh BAO** Hiba Alreefy, AFRCS, FRCS-ORL HNS, CCT***

A fifty-one-year-old male was diagnosed with recurrent frontal sinusitis; the patient completed the full course of optimal medical therapy: nasal steroids, antibiotics and nasal douches. The patient's symptoms did not improve including frontal headaches, nasal congestion and facial tenderness over the frontal sinus. CT scan of the sinuses was performed, and it confirmed the diagnosis of isolated right frontal sinusitis. The patient underwent "balloon sinus dilatation under local anesthesia" in the ENT outpatient clinic, and he was followed-up for 18 months to monitor any complication or symptom. This was the first case that had balloon sinuplasty procedure in Bahrain under local anesthesia in a clinic setting.

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Balloon Sinuplasty (BSP) is an endoscopic, catheter-based minimally-invasive technology that uses a balloon dilatational system to dilate the ostium of the blocked sinuses via illustration guide wire, and a balloon is introduced to relieve the obstruction effectively with subsequent restoration of the natural sinus function. It was based on the balloon angioplasty that has historically been used by cardio-thoracic and vascular surgeons.

BSP was approved by the US Food and Drug Administration in April of 2005, it was first performed in 2006 by Bolger and Vaughan on Anatomic models and human cadaver specimen to design and recapitulate the catheter-induced trauma which successfully dilated the ostia[1,2]. Subsequent multicenter studies in living patients demonstrated the safety and effectiveness in relieving ostial obstruction[3-5].

The aim of this report is to evaluate the role of balloon sinuplasty in the treatment of frontal sinusitis under local anesthesia in an out-patient clinic setting.

THE CASE

A fifty-one-year-old male with a known case of DM type 2, HTN and dyslipidemia presented with chief complaints of nasal congestion, frontal headaches and facial tenderness for ten years. The patient was diagnosed clinically with recurrent sinusitis and received a full course of nasal steroids, antibiotics and nasal douches. The patient reported no improvement. A non-contrast CT scan of the sinuses was performed and revealed total opacity of the right frontal sinus, minimal ethmoidal air cells with air-fluid level, very minimal mucosal thickening of the maxillary sinuses and bilateral patent osteomeatal complex, see figures 1 (A and B) and 2 (A and B). Diagnosis of right frontal sinusitis was confirmed, with minimal involvement of the ethmoidal and maxillary sinuses. Since there were neither contraindications nor limitations, the patient was considered a candidate for BSP procedure.

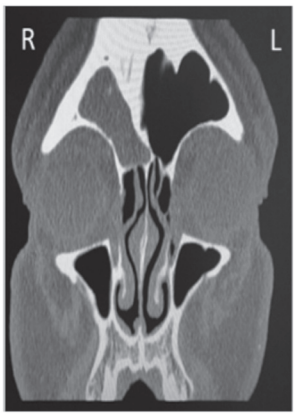

Figure 1A

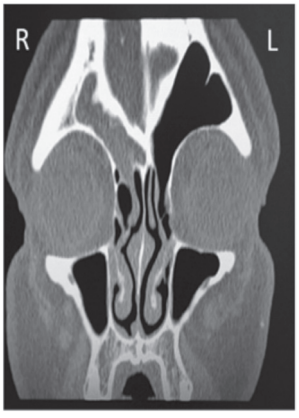

Figure 1B

Figures 1 A and B: Non-Contrast CT Sinus Coronal Views: Total Opacity of the Right Frontal Sinus

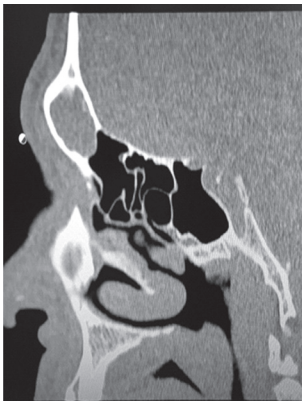

Figure 2A

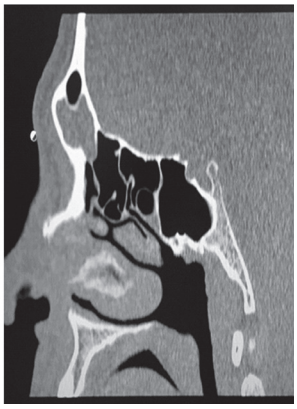

Figure 2B

Figures 2 A and B: Non-Contrast CT Sinus: Total Opacity of the Frontal Sinus. The Other Sinuses Shown are Well-Aerated

* Medical Intern
** Senior House Officer
*** Consultant, Head of Department
Department of ENT
King Hamad University Hospital
Kingdom of Bahrain
Email: azoz.baz@hotmail.com, drhibaalreefy@hotmail.com

Preoperatively, a Sino-Nasal Outcome Test (SNOT-22) survey was performed with a total score of 65. The SNOT-22 was used as a method to review the patient's symptoms, including the need to blow their nose, coughing, nasal discharge, facial pain/pressure, ear fullness/pain, blockage/congestion of the nose and other related symptoms. Treatment options were discussed with the patient, which included endoscopic sinus surgery and BSP. The patient opted for BSP because it is less invasive option and does not need general anesthesia. The procedure was performed under local anesthesia; it was the first case in Bahrain to be treated using this procedure in a clinic setting.

Postoperatively, SNOT-22 survey was performed with a total score of 4, showing that the patient's symptoms had mostly resolved with significant improvement in the quality of life, demonstrating that the procedure was safe, effective and an appropriate choice for that particular patient. A one-year follow-up revealed significant improvement of the patient symptoms.

Another SNOT-22 survey was performed 18 months postoperatively which revealed a total of 43, indicating ear pain and fullness, with no recurrence of any nasal symptoms or headaches.

DISCUSSION

Balloon sinuplasty is especially suited for patients with recurrent acute rhinosinusitis or chronic rhinosinusitis refractory to medical treatment.

Performing a BSP procedure in a clinic setting under local anesthesia is safe, well-tolerated, cost-effective and time-saving for both the patient and the hospital. Furthermore, it results in an earlier discharge and avoidance of the risks that are associated with general anesthesia[6].

Indications for this procedure are no different than the indications for the standard functional endoscopic sinus surgery; however, there are limitations to the procedure. The use of balloon sinuplasty in complex anatomical pathologies of the frontal recess, such as agger-nasi-cell, frontoethmoidal cell, frontal bulla cell or combination of these, or in cases of severe osteoneogenesis, is controversial[7]. CT scan prior to the procedure would identify these pathologies. In such cases, dilation of the frontal recess may be challenging and functional endoscopic sinus surgery may be preferred.

Contraindications include evidence of nasal polyps, Samter's triad, allergic fungal sinusitis, hyperplastic sinusitis or suspected neoplasm.

Theoretically, complications might occur with BSP including, but not limited to creation of a false passage intracranially or into the orbit, risk of neurovascular injury, especially of the internal carotid arteries and optic nerves, while performing on the sphenoid sinus, fractures by balloon dilatation with subsequent piercing or tearing of the dura mater and rupture during inflation at higher than recommended pressure or by sharp bony edges.

None of these theoretical complications have been reported in the literature to date. Furthermore, data have shown that the positive results after BSP are durable for a minimum of two years, which is equal to or exceeds those reported after conventional functional endoscopic sinus surgery[8]. However, the physician must be careful in offering this procedure only to patients who are eligible candidates[9].

It is an ethical prerogative to inform the patient that they might benefit from revision surgery irrespective of the outcomes of the original procedure. The patient has a full right to be given complete information regarding their prognosis and management.

CONCLUSION

Balloon Sinuplasty is a less invasive procedure, especially for patients who have contraindications to general anesthesia or with multiple comorbidities.

Proper counseling has a role in patient's management and orienting the patient to the risks and complications prior to procedure.

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REFERENCES

1. Relieva Sinus Balloon Dilation Catheter. U.S. Food and Drug Administration (FDA). http://www.accessdata.fda.gov/cdrh_docs/pdf4/K043527.pdf Accessed in August 2015.
2. Bolger WE, Vaughan WC. Catheter-Based Dilation of the Sinus Ostia: Initial Safety and Feasibility Analysis in a Cadaver Model. Am J Rhinol 2006; 20(3):290-4.
3. Brown CL, Bolger WE. Safety and Feasibility of Balloon Catheter Dilation of Paranasal Sinus Ostia: A Preliminary Investigation. Ann Otol Rhinol Laryngol 2006; 115(4):293-9; discussion 300-1.
4. Bolger WE, Brown CL, Church CA, et al. Safety and Outcomes of Balloon Catheter Sinusotomy: A Multicenter 24-Week Analysis in 115 Patients. Otolaryngol Head Neck Surg 2007; 137(1):10-20.
5. Raghunandhan S, Bansal T, Natarajan K, et al. Efficacy & Outcomes of Balloon Sinuplasty in Chronic Rhinosinusitis: A Prospective Study. Indian J Otolaryngol Head Neck Surg 2013; 65(Suppl 2):314-9.
6. Hopkins C, Carter A, Al-Reefy H. Outpatient Balloon Sinuplasty for Chronic Rhinosinusitis. The Otorhinolaryngologist 2014; 7(3): 151-4. http://theotorhinolaryngologist.co.uk/index.php/journal-issues/volume-7-n3/item/406-outpatient-balloon-sinuplasty-for-chronic-rhinosinusitis Accessed in November 2015.
7. Heimgartner S, Eckardt J, Simmen D, et al. Limitations of Balloon Sinuplasty in Frontal Sinus Surgery. Eur Arch Otorhinolaryngol 2011; 268(10):1463-7.
8. Catalano P. Balloon Dilation Technology: Let the Truth Be Told. Curr Allergy Asthma Rep 2013; 13(2):250-4.
9. Marzetti A, Tedaldi M, Passali FM. The Role of Balloon Sinuplasty in the Treatment of Sinus Headache. Otolaryngol Pol 2014; 68(1):15-9.