ARTIGO ORIGINAL

Acta Med Port 2005; 18: 249-256

POWERED ENDOSCOPIC NASAL SEPTAL SURGERY

ADERITO DE SOUSA F, LIVIA INCIARTE F, HOWARD LEVINE

Unit of Otorhinolaringology & Otorhinolaringoendoscopy, Instituto Medico La Floresta, Caracas – Venezuela.
Cleveland Nasal-Sinus & Sleep Center, Cleveland, Ohio. USA.

SUMMARY

While nasal endoscopy is typically used for diagnosis and sinus surgery, endoscopy can be combined with powered instrumentation to perform nasal septal surgery. Powered Endoscopic Nasal Septum Surgery (PENSS) is an easy, effective and quick alternative to traditional *headlight* approaches to septoplasty. PENSS limits the dissection to the area of the deviation and markedly reduces the extent of subperichondrial dissection. This is particularly valuable in patients who have undergone prior septal cartilage resection. PENSS was used in 2,730 patients over 8 years. Surgical indications and technique are discussed. These patients had either isolated nasal septal deformities associated with other rhinologic pathology (sinusitis, adenoid hypertrophy polyps and external nasal deformity). PENSS was utilized with video assistance to allow an enhanced view of the endoscopic operative field. These patients were operated upon in an outpatient surgical suite and were seen for a post-operative video endoscopic evaluation at 5, 10, 15 and 20 days after surgery. The patients who had associated functional endoscopic sinus surgery were evaluated as needed until 6 weeks after surgery. There were no delayed complications.

Endoscopic resection of septal spurs, deformities and deviations can be performed safely alone or in combination with endoscopic sinus surgery with minimal additional morbidity.

Key Words: Nasal septum, endoscopic-assisted septum surgery, powered instrumentation.

RESUMO

CIRURGIA ENDOSCÓPICA DO SEPTO NASAL COM INSTRUMENTO ELECTROMECÂNICO

Enquanto a endoscopia nasal é utilizada para o diagnóstico e a cirurgia dos seios paranasais, podendo ser combinada com instrumentos electromecânicos para a cirurgia do septo nasal. A cirurgia endoscópica do septo nasal com instrumentos electromecánicos (CESNIE) é uma alternativa sensata, eficaz e rápida em comparação com os procedimentos tradicionais de septoplastia com luzfrontal. A cirurgia endoscópica do septo nasal permite delimitar visão directa baixa a área de dissecção do desvio. Esta é particularmente de grande utilidade em doentes que sofreram cirurgia septal previa com ressecção da cartilagem septal. No presente artigo discute-se as indicações quicirurgica e a sua técnica. A CESNIE foi utilizada em 2730 doentes a partir dos oito anos de idade. Estes doentes apresentavam deformidades do septo nasal isoladas e associadas com outras patologias de ORL (sinusites, pólipos, hipertrofia dos adenóides e deformidades nasais externa). A CESNIE praticada com vídeo permitiu uma visualização amplificada no campo operatório. Todos os doentes foram intervencionados em regime ambulatório e controlados em consulta endoscópica durante os primeiros 5,10,15 e 20 dias, após a cirurgia. Os doentes que também beneficiaram com a cirurgia endoscópica dos seios associada foram avaliados a partir das seis semanas pós-operatório. Nenhum dos casos apresentaram complicações tardias A ressecção endoscópica dos esporões septais podem originar deformidades e desvios seguramente só ou em combinação com a cirurgia do seio endoscópica com uma morbilidade adicional mínima.

Palavras Chaves: Septo nasal, cirurgia endoscópica do septo com instrumento electromecânico

Recebido para publicação: 19 de Janeiro de 2004

INTRODUCTION

Nasal endoscopy is an excellent method for the precise diagnosis of pathological abnormalities of the nasal septum. It permits the correlation between these abnormalities and the lateral nasal wall. While nasal endoscopy is typically used for diagnosis and treatment of sinus disease, endoscopy can be combined with powered instrumentation to perform nasal septal surgery.

PENSS can limit the dissection and minimize trauma to the nasal septal flap. This is especially valuable for the patient having had previous nasal septal surgery.

We present our experience with PENSS in a series of 2,730 patients over 8 years. Surgical indications and technique are discussed. These patients had either isolated nasal septal deformities were associated with other rhinologic pathology (sinusitis, adenoid hypertrophy polyps and external nasal deformity).

All patients reported who had recurrent or persistent nasal and sinus pathology were studied with video-endoscopic nasal evaluation and CT scan.

The PENSS was utilized with video assistance to allow an enhanced view of the endoscopic operative field. These patients were operated upon in an outpatient surgical suite and were seen for a post-operative video endoscopic evaluation at 5, 10, 15 and 20 days after surgery. The patients who had associated functional endoscopic sinus surgery were evaluated as needed until 6 weeks after surgery. There were no delayed complications.

Endoscopic resection of septal spurs, deformities and deviations can be performed safely alone or in combination with endoscopic sinus surgery with minimal additional morbidity.

MATERIALS AND METHODS

From 1994 to 2002, 2,730 cases of functional endoscopic nasal septal surgery using powered instrumentation at the Instituto Medico la Floresta. There were 1,557 males and (57%) and 1,173 females (43%) with ages ranging from 10 to 80 years old). Six hundred and fifty-five cases (23%) had a prior nasal trauma within a two year period, 683 patients (25%) had previous trauma occurring greater than 2 years, and 1,392 patients (50.9%) had no history of nasal trauma.

Six hundred and twenty three patients (22.8%) had had one prior nasal or sinus operation. One hundred and ninety one (6.9%) had two prior operations and 82 patients (3%) had 3 or more prior nasal or sinus operations. Of these patients, 2,110 cases (77%) had undergone endoscopic sinus surgery. All of these patients had nasal septal deformities associated with other sinus or nasal pathology (i.e. chronic sinusitis, adenoids hypertrophy, polyps and external nasal deformity). They were treated medically before surgery with topical steroids sprays, mucolytics, antihistamines, or allergy desensitization. All of the patients were studied with video endoscopic nasal evaluation and CT scan.

Powered functional endoscopic septal surgery (PENSS) was performed with video assistance (Figure 1). The endoscopic view was visualized on a television monitor which allowed the deviated nasal septum to be seen under excellent visualization avoiding the need of a head light. When combining the procedure with sinus surgery, the same instruments were used. Standard nasal endoscopes (0º, 25º or 30º angle 4 mm outer diameter) and suction--irrigation system (Karl Wolf®) were used.

Fig. 1 - OR -view of a Powered endoscopic nasal septal surgery.

Most procedures were performed with a 25º telescope and microshaver. A 4mm burr allowed drilling, suction, and irrigation to be performed with one instrument (Smith & Nephew Dyonics Inc., Xomed™or Stryker®). Any non--powered instrumentation for performing this procedure was the same used in the traditional septoplasty (dissectors, suctions). Additionally PENSS was performed either as an isolated procedure or in combination with functional endoscopic sinus surgery, partial turbinoplasty or adenoidectomy. Most often PENSS was performed first followed by the sinus procedure. Patients were operated as outpatients and are followed at 5, 10, 15 and 20 days after surgery. The patients who also underwent FESS were evaluated periodically until completing 6 weeks of follow-up. Silicone septal splints were used and removed 4 to 7 days after surgery. The endoscopic follow-up was required to remove crusts and granulation tissue.

In the operating room, the nasal cavity was anaesthe-

tized with 0.05% oxymetazoline moistened nasal cottonoids 3 minutes before surgery. Xylocaine and 1:100.000 adrenaline solution was injected into the submucoperichondrium bilaterally. Since the superior and posterior region of the nasal septum was more difficult to visualize with a nasal speculum, it is injected endoscopically. The injection helped to elevate the mucosa from the cartilage bony nasal septum.

A hemitransfixion incision was made and the mucosa elevated over the cartilage (Figure 2). A mucoperichondrial and mucoperiosteal flap was elevated using a suction elevator (Figure 3). Elevation of the posterior tunnel was performed with endoscopic visualization (Figure 4). An incision was made through the cartilage to the contralateral side and a posterior tunnel created under direct endoscopic visualization (Figure 5). The septal mucosa was completely elevated exposing the entire bony and cartilaginous skeleton (Figure 6).

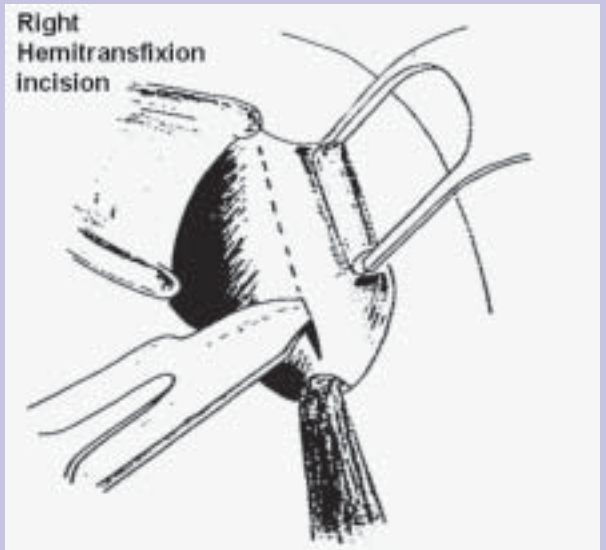

Fig. 2 - Right hemitransfixion incision.

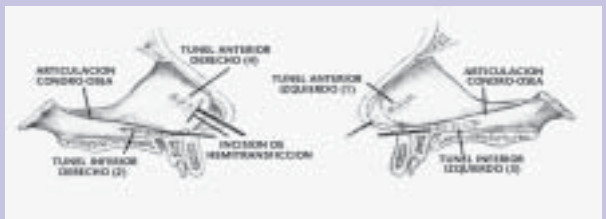

Fig. 3 - Mucoperichondrial tunnels.

The mucosa overlying any spur and/or deviation was generally more fragile and attenuated. The endoscopic submucoperichondrial flap dissection seemed to reduce septal mucosal lacerations which in turn decrease the risk of a permanent perforation (Figure 6). Any septal spur was reduced using powered instrumentation (microshaver) (Figures 7 and 8) or deviation corrected using standard instrumentation.

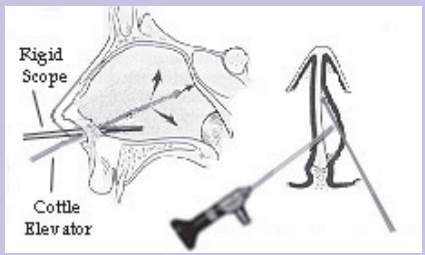

Fig. 4 - The endoscope is placed and the surgeon advances with the Cottle dissector (right arrows) to elevate the mucoperichondrial and mucoperiosteal flap.

Fig. 5 - the position of the endoscope through the nasal septum.

The cartilage and bone was resected with scissors or through-cutting forceps. Deviations and spurs in the premaxilla can be reduced with powered instrumentation or removed manually with forceps.

Fig. 6 - Endoscopic dissection view of one isolated septal spur without septal mucosal laceration using the 25° telescope.

Although powered instrumentation has revolutionized the functional septoplasty, manual instrumentation was occasionally used to remove bony partitions of the perpendicular plate of the ethmoid and/or the deviated septal cartilage (Figure 9). The isolated septal spurs and obstructing maxillary crest were approached with a horizontal incision along the apex of the spur. The mucosa was elevated superi-

Fig. 7 - Endoscopic view of an isolated spur markedly deviated to the inferior and middle turbinate.

Fig. 8 - Powered endoscopic nasal surgery result of the previous isolated spur.

orly and inferiorly allowing the resection with non powered instrumentation. The spur was reduced with microshaver.

The nasal cavities were endoscopically evaluated after correcting the defect to be certain that the septum is straight and the airway open. In addition, a conventional examination with speculum and headlight was recommended to appreciate any septal cartilage defects difficult to access using endoscopic techniques. If a deviation persists, it was corrected.

The hemitransfixion incision was closed with 2 or 3 chromic sutures. Splints were used to support the nasal septum and the mucosa. Septal splints with ventilation tubes *(Xomed™or Smith & Nephew Richards Inc.)* without nasal postoperative packing were used and have the following advantages: minimize synechiae formation, stabilize the septum and provide comfort during recovery by maintaining an airway. Septal splints were removed from 4 to 7 days after surgery.

If a bilateral mucosal tear was present, crushed cartilage or bony was inserted into the septal pocket to minimize the chance of a septal perforation.

Fig. 9 - Non powered septal resection

RESULTS

Fifty-one patients (1.8%) had a septal hematoma. All resolved spontaneously. Twenty-one cases (0.7%) had a septal perforation less than 2 cm in diameter. Forty-eight patients (1.8%) had a slight postoperative deviation and 24 (0.8%) had a severe postoperative deviation. There were no postoperative infections. There were no patients with postoperative bleeding. No orbital injuries or cerebral spinal fluid leaks occurred.

DISCUSSION

Powered Endoscopic Nasal Septum Surgery (PENSS) is an easy, effective and quick alternative to traditional *headlight* approaches to septoplasty. PENSS limits the dissection to the area of the deviation. This ability to markedly reduce the extent of subperichondrial dissection is particularly valuable in patients who have undergone prior nasal septal surgery. The primary advantage of this technique is the enhanced and detailed observation of the various components of the septal skeleton, a selective and conservative resection of the septal abnormalities, an accurate dissection of the submucoperichondrial flap, a reduction in the incidence of septal mucosal lacerations and opposing mucoperichondrial flap tears, and the ability to reduce morbidity and postoperative swelling in isolated septal deviations. Other advantages include improved visualization, particularly in posterior septal deformities; improved surgical transition between septoplasty and sinus surgery; and its use as an effective teaching tool.

With the introduction of powered instrumentation, the smallest septal deviations posteriorly and superiorly located (Cottle area 3, 4, 5) (Figure 10) was visualized and easily reduced (Figures 11 and 12).

Fig. 10 - Cottle areas: 1. Vestibular area 2. Valvular area 3. Atical area 4. Medial turbinal area 5. Posterior turbinal area or Choanal.

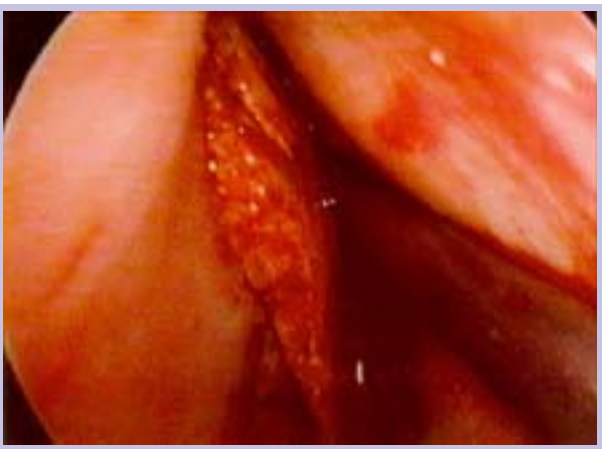

Fig. 11 - During endoscopic septoplasty the cartilage and bone is resected with powered instrumentation and the Lamina perpendicularis of the ethmoid remains thicked and is partially endoscopic resected with a Blakesley forceps.

Fig. 12 - Correction of the deviated septum improved nasal ventilation and enhanced visualization for access to the ostiomeatal complex.

Powered endoscopic instrumentation permited complete removal and excellent exposure of the surgical field including a more precise, cautious and conservative approach.

Many patients have small deviations near the middle turbinate that narrow the middle meatus predisposing to obstruction in the ostiomeatal complex and impairing mucocilliary clearance and sinus drainage. These findings are more easily seen on nasal endoscopy rather than traditional rhinologic exam with nasal speculum and headlight.

Cantrell[1] reported the management of small septal defects with limited surgery rather than a formal septoplasty. The authors have used these criteria to optimize nasal ventilation and also improving post operative sinus drainage. The authors have performed endoscopic limited septoplasty using with powered instrumentation for deviations occurring at the chondro-osseus junction of the quadrangular cartilage and perpendicular plate of the ethmoid along with FESS to improve nasal ventilation and enhance visualization for access to the ostiomeatal complex both during surgery and follows-up examination (Figures 11 and 12). Correction of the deviated septum associated with sinus surgery may also help minimize postoperative sinusitis caused by scar formation between the middle turbinate and the lateral nasal wall.

Fig. 13 - Powered endoscopic nasal surgery is an effective teaching tool at the OR.

Fig. 14 - Powered electromechanic hand piece of Dyonics Inc.

Figs. 15 y 16 - External view of endoscope and electromechanic hand piece in septal tunel.

CONCLUSION

The powered functional endoscopic septal surgery (PENSS) is a useful approach to correct septal deviations. We have used this technique over the past 8 years in 2,730 patients. In our experience this approach offers significant advantages compared to the traditional techniques using the headlight and nasal speculum. There is improved safety due the enhanced viewing conditions during sinus and septal surgery, particularly in posterior and superior septal deformities and difficult areas to access using the traditional technique. Other advantages are the direct dissection of the mucoperichondrial flap minimizing septal mucosal lacerations and reducing the surgical trauma (morbidity and swelling reduced), limiting the dissection to the deviated area.

There is an easier surgical transition between septoplasty and FESS. Powered instrumentation allows a selective and conservative reduction of nasal septal deviations (minimizing the perforation risk). Finally, powered dissection is an effective teaching tool.

REFERENCES

1. CANTRELL H: Limited septoplasty for endoscopic sinus surgery. Otolaryngol Head Neck Surg 1997;116(2):274-7

2. CANOVAS LLORENS D L; Carbonell Casasus J; Mas Mercant.: Liberacion septal en cirugia endoscopica nasosinusal [Release of the septum in endoscopic nasosinusal surgery]. An Otorrinolaringol Ibero Am 1997;24(2):197-202

3. COTTLE M H; LORING R M: Surgery on the nasal septum: New operative procedures aid indications. Ano Otol Rhinol Laryngol 1948; 57: 705

4. COTTLE M H; LORING R M, FISCHER G G et al: The "Maxila--Premaxila" approach to extensive septum surgery. Arch Otolaryngol 1958;68:301

5. CHRISTMAS DA; YANAGISAWA E: Powered endoscopic excision of the septal ridge. Ear Nose Throat J 1999 Jul; 78(7): 466-7.

6. DE SOUSA A; OQUENDO M; DE CASTRO C: XXIV Pan American Congress of Otolaryngology, Head and Neck Surgery. The Endoscopic Nasal Septum Surgery (video Presentation). Nov. 4th. 1994. Margarita Island-Venezuela, 1994.

7. DE SOUSA A; OQUENDO M; DE CASTRO C: XXIV Pan American Congress of Otolaryngology, Head and Neck Surgery. The Endoscopic Nasal Septum Surgery (Free Papers). Nov. 5th. 1994. Margarita Island-Venezuela, 1994.

8. DRAF W: Endoscopy of The Paranasal Sinus. New York. Springer Verlag, 1983.

9. BELL JW; BERGER EL et al: New approach to ventral deflections of the nasal septum. Arch Otolaryngol. 1951;54:356

10. FREER OT: The correction of deflections of the nasal septum with a minimum of traumatism. JAMA. 1902;38:636

11. GUSTAVSON R; KERN E: Office Endoscopy. When, Why, What and How. Otolaryngologic Clin. North Am., 22:683, 1989.

12. HAAPANIEMI JJ; SUONPAA JT; SALMIVALLI AJ; TUOMINEN J: Prevalence of septal deviations in school-aged children. Rhinology 1995 Mar;33(1):1-3

13. Hinderer KH: Fundamentals of anatomy and surgery of the nose, Birmingham, Ala, 1971, Aesculapius Publishing Co.

14. Hinderer KH: Nasal problems in children, Pediatr Otolaryngol. 5:499, 1976.

15. HWANG PH; MCLAUGHLIN RB; LANZA DC; KENNEDY: Endoscopic septoplasty: indications, technique, and results. Otolaryngol Head Neck Surg 1999 May;120(5):678-82.

16. JENSEN PP; KRISTENSEN S; JUUL A; JOHANNENSSEN NW: Episodic nocturnal hypoxia and nasal packs. Clinical Otolaryngology. Oct. 16. 1991;5:433-5

17. KENNEDY D: Functional Endoscopic Sinus Surgery. Therapy and Diagnostic Evaluation. Arch Otolaryngol. 1985;111:576

18. KENNEDY D: Functional Endoscopic Sinus Surgery. Technique. Arch Otolaryngol. 1985;111:643

19. KILLIAN O: The submucous window resection of the nasal septum. Ann Otol Rhinol Laryngol. 1905;14:363

20. LANZA D; FARB D; KENNEDY D: Endoscopic Spur Resection. Am J. Rhinology 1993;7:213-216

21. LOW WK; WILLAT DJ: Sub mucous resection for deviated nasal septum: Acritical appraisal. Singapore Medical Journal, 1992; Dec. 33(6):617-9, .

22. MALTZ M: New Instrument. The Sinuscope. Laryngoscope 1925;35:805

23. MESSERKLINGER W: Endoscopy of the Nose. Urban & Schwarzenberg, Baltimore-Munich. 1978

24. METZEMBAUM M: Replacement of the lower end of the dislocated septal cartilage versus sub mucous resection of the dislocated end of the septal cartilage. Arch Otolaryngol. 1929;9:282

25. MOROKHOEV VI: Various aspects of endonasal corrective surgery, Vestnik Oto-Laringologil. Jul-Aug: 1990;(4):47-51

26. MURRANT NJ; EVANS KL; LAVELLE RJ: Intranasal splints and their effects an intranasal adhesions and septal stability. Clinical Otalaringology. Feb: 1992;17(1):24-7

27. NASS RICHARD L: Diagnosis of Surgical Sinusitis Using Nasal Endoscopy and Computerized Tomography et al. Laryngoscope: 1989;99:1158

28. NAYAK DR, BALAKRISHNAN R, MURTHY KD.: An endoscopic approach to the deviated nasal septum—a preliminary study. Otolaryngol Head Neck Surg 1999 May;120(5):678-82.

29. NÚÑEZ DA, MARTIN FW: An evaluation of post-operative packing in nasal septal surgery. Clinical Otolaringology. Dec: 1991; 16(6): 549-50

30. PARK DH, KIM TM, HAN DG, AHN KY: Endoscopic-assisted correction of the deviated nose. Aesthetic Plast Surg 1998 May--Jun; 22(3):190-5.

31. PARSONS DS, BATRA PS: Functional endoscopic sinus surgical outcomes for contact point headaches. Laryngoscope 1998 May; 108(5):696-702.

32. PEER LA: An operation to repair lateral displacement of the lower border of the septal cartilage. Arch Otolaryngol. 1937;25:475

33. PROCTOR DF: The Nose, Paranasal Sinus and Pharynx. In Walters W. [al.] Lewis- Walters Practice of Surgery. vol. 4. Hagerstow N., W.F. Prior Co., 1966.

34. STAMMBERGER H: Endoscopic Endonasal Surgery - Concepts in Treatment of Recurring Rhinosinusitis. Pan 1 Anatomic aoci Pathophysiologic Considerations. Otolaryngol. Head Neck Surg.: 1986;94:143

35. STAMMBERGER H: Endoscopic Endonasal Surgery - Con-

cepts in Treatment of Recurring Rhinosinusitis. Pan II. Surgical Technique. Otolaryngol. Head Neck Surg: 1986;94:147
36. STAMMBERGER H, WOLF O: Headaches aoci Sinus Disease: The Endoscopic Aproach. Annals of Otol Rhinol & Laryngol. vol. 97 N0 5, Part. 2. Supplement 134, 1988; Sept.-Oct
37. STANKIEWICZ JA: Complications of Endoscopic Nasal Surgery: Occurrence aoci Treatment. Am. J. Rhinol. 1987;1:45
38. STREITMANN et al. : Anatomic Considerations in complications of Endoscopic and Intranasal Sinus Surgery. Ano Otol Rhinol Laryngol: 1994; 103
39. TERRIER O: L'endoscopic Rhinosinusale Moderne, 1978.
40. VANCLOOSTER C, JORISSEN M: Endoscopic septal spur resection in combination with endoscopic sinus surgery. Acta Otorhinolaryngol Belg 1998;52(4):335-9.
41. VINING EM, YANAGISAWA K, YANAGISAWA E: The importance of Preoperative Nasal Endoscopy in Patients with Sinonasal Disease. Laryngoscope. 1993;103:512
42. ZINREICH SJ, KENNEDY D, et al: Paranasal Sinuses: CT Imaging Requirements for endoscopic Surgery. Radiology. 1987; 163: 769
43. YANAGISAWA E, JOE J: Endoscopic septoplasty. Ear Nose Throat J 1997 Sep;76(9):622-3.
44. YANAGISAWA E: Endoscopic view of a high septal deviation. Ear Nose Throat J 2001 Feb;80(2):68-70.

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