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ENDOSCOPIC SINUS SURGERY FOR NASAL POLYPS: A LITERATURE REVIEW

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Abstract:

Background: *Functional endoscopic sinus surgery (FESS) has been used for 30 years for the management of sinus disease including the excision of nasal polyps. Our objective was to perform a review of safety and effectiveness of FESS for the removal of nasal polyps.*

Methods: *The Cochrane Library, MEDLINE, Embase, Science Citation Index, other databases, and websites were searched in January and December 2019 using key words for nasal polyps and endoscopic surgery.*

Results: *Three randomized controlled trials, 4 nonrandomized comparative studies, and 35 case series studies were included in the review. FESS was compared with endoscopic polypectomy, Caldwell-Luc, radical nasalization, and intranasal ethmoidectomy.*

Keywords: *Endoscopic Sinus Surgery, Nasal Polyps, Safety, Review.*

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INTRODUCTION:

Functional endoscopic sinus surgery (FESS) has been used for 30 years in the treatment of sinus disease. Definitions of FESS vary, but for the purpose of this review it is defined as a minimally invasive technique, using an endoscope to restore nasociliary clearance of mucous, drainage, and aeration of the sinuses. Advantages are claimed over surgery without an endoscope including a better view of the surgical field, a more precise and thorough clearance of inflamed tissue, fewer complications, and lower recurrence rates [1].

The lifetime prevalence of nasal polyps has been estimated as 0.2–1% in the United Kingdom [2]. Although surgery is a second-line option, many cases fail to respond to medical management. Reports of complications from FESS have increased as the number of procedures performed has grown [3]. However, no comprehensive systematic review of the use of FESS for this common and important condition in surgical rhinology has been published to date. Therefore, the aim of this systematic review was to identify and assess available primary research on the safety and effectiveness of FESS for the removal of nasal polyps.

MATERIALS AND METHODS:

Searches were performed in the following databases: The Cochrane Library (issue 4, 2019), MEDLINE (1966–2019), Embase (1980–2019), and Science Citation Index (1981–2019). In addition, the following databases and websites were searched: Web of Science Proceedings, BIOSIS, CINAHL, National Research Register, Health Management Information Consortium, British Library Catalog, Clinical trials.gov, SERNIP, and UK Medical Devices Agency. Hand searching of reference lists was performed also. Searching was conducted in January 2019 using a range of terms for nasal polyps and endoscopic surgery. Articles not published in English were excluded from the search. Searches of Medline and Embase were updated in December 2018. Complete details of search strategies are available from the authors.

All randomized controlled trials and nonrandomized comparative studies that compared any type of FESS with any other surgical intervention for the excision of nasal polyps were included. In addition, we included case series studies including 50 patients with nasal polyps. This limit on number was chosen to maximize representativeness and therefore generalizability. Studies were excluded if they did not report complications or patient-relevant outcomes, focused on the use of the endoscope for diagnosis rather than treatment or were a duplicate publication. Study selection was performed independently by two reviewers and differences were resolved by consensus.

Using a structured form, the patient characteristics, complications, clinical outcomes, and validity were extracted and assessed by two reviewers. Differences were resolved by consensus. Meta-analysis was considered but not performed because of clinical and methodological heterogeneity between studies.

RESULTS:

Study Characteristics

The search identified 632 articles, 42 (6.6%) of which were included after completing the selection process (Fig. 1). Three studies were randomized controlled trials, 4 studies were nonrandomized comparative studies, and 35 studies were case series. Update searches of Medline and Embase performed in December 2018 yielded no additional studies.

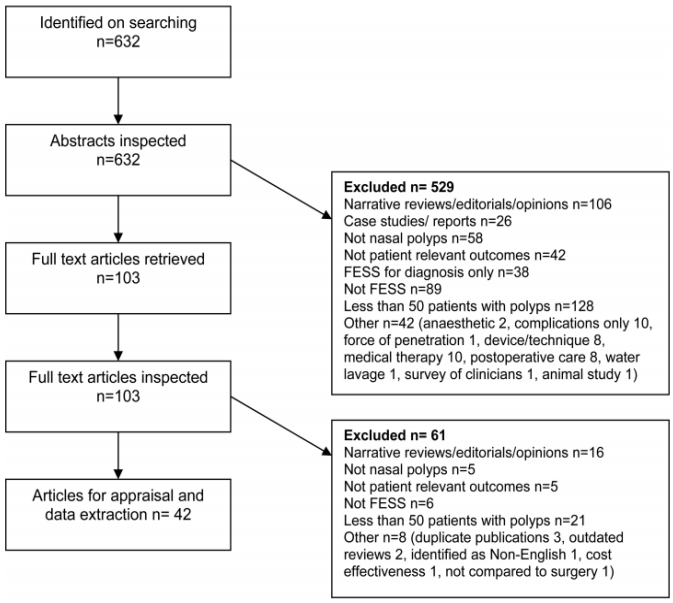

Figure 1: Inclusion process

Safety of FESS

Comparative Studies. Three of the seven comparative studies reported complication rates [4-11]. Harkness and colleagues reported a complication rate of 1.4% for FESS compared with 0.8% for conventional procedures. Jankowski and colleagues reported no complications for the functional ethmoidectomy group and 7.7% for the radical nasalization group. Penttila¨ and colleagues35 reported that there were no major complications in either the FESS or the Caldwell-Luc groups. Case Series Studies. Reported complications ranged from 0.3 to 22.4% (median, 7.0%), with much variation in severity reported. Major complications ranged from 0 to 1.5% (median, 0%) [6,11,15,16] and minor complications ranged from 1.1 to 20.8% (median, 7.5%). Types of Complication Hemorrhage. the median percentage across studies (comparative and case series) for each type of hemorrhagic complication associated with FESS. Median reports of "general bleeding" or severe bleeding/bleeding requiring packing or admission were 2.5 and 2.2%, respectively. Infection. Postoperative infection was reported for 16% of FESS procedures and 28% of conventional procedures in the randomized trial by Venkatachalam and Bhat.40 Sobol and colleagues41 reported 0.3% meningitis and 0.5% orbital cellulitis for FESS. Wigand and Hoseman37 reported 0.5% meningitis for FESS. Garrel and colleagues reported 1.6% methicillin-resistant Staphylococcus aureus infection. Intranasal Complications. The median percentage across studies (comparative and case series) for each type of intranasal complication for FESS.

Nonspecific or Other Complications.

Cheek pain/tenderness occurred in 4% of cases for the FESS group and 76% of cases for the Caldwell-Luc group in the Penttila¨ study. Pain was reported for 0.7% of FESS procedures in the Jiang study. Unremoved nasal packs or sponges occurred in 0.08 and 0.2% of cases (Jiang31 and Stammberger28 studies, respectively). Repeat surgery to complete the FESS procedure was required for 0.2% of people in the study by Stammberger and Posawatz.28 Harkness and colleagues34 reported that 0.07% of the conventional procedures group had cheek edema, 0.07% had unspecified complications, and 0.07% had anosmia. Jiang and colleague reported atrophic rhinitis for 0.08% of procedures and Stammberger and Posawatz reported soft tissue infiltration for 1.8% of cases. Relationship between Complications and Revision Surgery. We explored the relationship between complication rates and revision surgery because this may carry greater risks due to prior removal of sinus landmarks There was no significant relationship.

Clinical Effectiveness Factors Influencing Surgical Success.

Information regarding medical management, stage of disease, instrument used to measure outcomes, length of follow-up, and physician experience are all critical to determining success of sinus surgery. The current studies provide limited information on these factors and results should be interpreted with caution.

Symptomatic Improvement.
Symptomatic improvement after FESS ranged from 78 to 88% versus 43 to 84% for comparative procedures (statistically significant difference in two studies, In the case series, symptomatic improvement ranged from 40 to 98% with a median of 88%.

Disease Recurrence/Revision.
Disease recurrence ranged from 4 to 60% with a median of 20% across all studies. Similarly, for revision surgery the range was 3–42% with a median of 6%.

Sense of Smell.
Preoperative smell disturbance ranged from 16 to 100% with a median of 47% compared with postoperative ranges from 3 to 38% with a median of 16% (follow-up ranged from an average of 3–60 months).

Nasal Obstruction and Patency.
Nasal obstruction ranged from 32 to 95% preoperatively, with a median of 70% compared with a postoperative range of 0–40% with a median of 8%. Overall postoperative patency of the middle meatus ranged from 57 to 100% with a median of 93% (follow-up ranged from 12 to 60 months).

DISCUSSION:

Case series studies of FESS reported a wide range of complication rates from 0.3 to 22.4%. However, the distribution is skewed with a median of 7.0%. Major complications ranged from 0 to 1.5% (median, 0%) and minor complications ranged from 1.1 to 20.8% (median, 7.5%).

Most frequent complications were hemorrhage (11 studies), CSF leaks/rhinorrhea (14 studies), and periorbital/orbital fat exposure (8 studies). The most serious reported complications were CSF leaks (median, 0.3%), injury to the internal carotid artery (0.3%), dural exposure (0.2%), meningitis (median, 0.15%), bleeding requiring blood transfusion (median, 0.2%), and orbital penetration (2.1%).

The overall complication rates found in this review are a wider range than those reported elsewhere. Stankiewicz estimates an overall complication rate for ESS ranging from 2 to 17%.42,43 Our review reports lower major complication rates (median, 0%) than those published previously. Kennedy and colleagues surveyed all U.S. Otolaryngologists and reported 0.4% major complications. Cumberworth and colleagues45 surveyed U.K. Otolaryngologists and found 0.23% major complications. We identified a slightly higher median CSF leak rate (0.15%) than the 0.1% figure reported by Kennedy and colleagues.

Overall complication rates were higher in FESS than comparative procedures in one study (1.4% versus 0.8%),34 equivalent in one study (0%), and lower in a third (0% versus 7.7%).33 The difference in adverse events is clearly related to the risk associated with the comparative procedure and prone to selection bias between studies. Facial numbness is much less common in FESS as would be expected given the fundamental difference in surgical approach. FESS may be more effective than comparative procedures in terms of symptomatic improvement. Smell disturbance and nasal obstruction were lower postoperatively than before FESS. However, the poor quality of available evidence and the lack of description of other important factors influencing success limit the certainty of these conclusions.

CONCLUSION:

The endoscope has been used for 20 years in sinus surgery and is standard equipment in most institutions. The results of the studies examined suggest that major complications from FESS are relatively rare and there is wide variation in the incidence of mild complications. ESS improves overall and specific symptoms, although there was wide variation in results, making it difficult to provide accurate estimates of the size effects. Variation in outcome and complication rates suggests the need for clearer clinical guidelines and audit in FESS. The quality of existing research is limited and future efforts should concentrate on producing a fuller description of potential confounding factors or effect modifiers to define more clearly the place of FESS in specific populations.

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