Outcome Analysis of Functional Endoscopic Sinonasal Surgery For Paediatric Rhinosinusitis Using The Lund-Mackay-Kennedy Scoring System

Sunil N Dutt, specialist Registrar, West Midlands, **Ahmad Haider-Ali**, Senior House Officer III, **Murray Stewart**, specialist Registrar in ENT, **Jialin Chen**, Public Health Researcher, Walsall NHS Trust
Simon M C Morrissey, Consultant ENT Surgeon. The Department of Paediatric Otolaryngology.
The Royal Hospital for Sick Children, Yorkhill Glasgow G3 8SJ, United Kingdom.

Abstract

There are very few indications for surgical management of chronic rhinosinusitis in children. This has been partly due to the fact that the definition of what qualifies as recalcitrant sinusitis in children is still obscure. There is also significant evidence in literature that surgery, especially radical surgery, on the nose and sinuses in children would result in some interference with the growth of the facio-maxillary skeleton. The advent of **Functional Endoscopic sino-nasal Surgery (F. E. S. S.)** in recent years has changed the philosophy of surgery for paediatric rhinosinusitis and has proven to be an effective choice of management in difficult cases.

We present here our experience and preliminary results with the use of FESS in nine children with sinonasal disorders including cystic fibrosis. The usefulness of the recently described Lund- mackay and Kennedy Scoring System for chronic rhinosinusitis in terms of symptom score, radiological score, endoscopic score and surgical score has been demonstrated.

Keywords

Rhinosinusitis, Paediatric Endoscopic Sinus Surgery, Functional Scoring System

Chronic and recurrent acute sinusitis are difficult to diagnose and treat in the paediatric population. The management is further clouded by the fact that there are a number of associations between sinus disorders and various systemic conditions and syndromes viz. Cystic fibrosis, immunodeficiency states, atopy and asthma and mucociliary disorders, to name a few. Several guidelines and criteria have already been put forward for the definitions and hence appropriate management of children with chronic and recurrent acute sinusitis (Lund and Kennedy, 1997; Parsons and Phillips, 1993). The management of recalcitrant

sinusitis in children (i.e. failed medical therapy) has been a challenge to otolaryngologists throughout the world. There are quite a few advocates of the use of FESS in children and these are mostly from the United States (Parsons and Phillips, 1993; Lusk and Muntz, 1990; Duplechain et al, 1991). We present here our modest experience with the use of FESS in children with the preliminary results.

Patients and Methods

The Royal Hospital for Sick Children in Glasgow is a tertiary referral centre for cases of cystic fibrosis

Table 1

Age and Sex Distribution of the study population

• RH	14yrs	F	Nasal Polyposis and Cystic fibrosis
• CT	9yrs	M	Chronic Rhinosinusitis and Cystic Fibrosis
• LM	9 yrs	F	Nasal Polyposis and Cystic fibrosis
• AP	10yrs	M	Chronic Rhinosinusitis with Asthma
• GR	8yrs	M	Nasal Polyposis and Cystic fibrosis
• AM	14yrs	M	Chronic Rhinosinusitis and Primary ciliary dyskinesia
• TW	9yrs	M	Nasal Polyposis and Cystic fibrosis
• JA	7yrs	M	Ethmoidal mucocoele and Asthma
• LA	10yrs	F	Recurrent Acute Rhinosinusitis and Asthma
– Age range : Males - 7 to 14 years Female- 9 to 14 yrs.			

Table II
Symptom Scores

Patient	Baseline	3 months	6 months	1 year	2 year	3 year
RH	54	28	15	8	8	8
CT	42	21	14	10	10	10
LM	51	26	12	12	10	-
AP	50	23	20	16	16	9
GR	42	16	12	10	7	
AM	47	25	17	16	10	
TW	42	19	11	11		
JA	42	14	8			
LA	41	27	17			

Table III
Symptom Scores : Statistics

Pairs	Mean	Standard deviation	Standard Error	T value	P value and Significance
Pair 1 Base to 3 mths	23.56	4.28	1.43	16.529	0.001 (HS)
Pair 2 Base to 6 mths	31.67	4.92	1.64	19.292	0.001 (HS)
Pairs 3 Base to 1 yr	35.00	5.60	2.12	16.543	0.001 (HS)
Pair 4 Base to 2 yrs	37.50	5.17	2.11	17.777	0.001 (HS)
Pair 5 Base to 3 yrs	39.67	7.09	4.10	9.684	0.01 (S)

and mucociliary disorders. Some of these children were identified as candidates for FESS when appropriate medical therapy failed. From 1995 to date, eleven children have undergone FESS (surgeon-MSCM), nine of them with a follow-up range from 6 months to 3 years. Table I shows the distribution of the patients.

Using the Lund-mackay Scoring (Lund and Kennedy, 1997), each child received scores for Symptoms (by Visual Analogue Method), CT scan features, Endoscopic Appearance and Surgical procedure. An attempt was made to be as conservative as possible with surgery which entailed in most cases-nasal polypectomy when present, uncinectomy-infundibulotomy, limited clearance of the anterior

Table IV
Endoscope Appearance Score

Patients	Baseline	3 months	6 months	1 year	2 years	3 years
RH	12	6	6	0	2	2
CT	8	7	2	0	2	2
LM	11	7	2	2	2	—
AP	10	6	0	2	2	2
GR	11	6	4	1	2	
AM	8	6	2	2	0	
TW	8	3	0	0		
JA	8	2	0			
LA	6	5	1			

Table V
Endoscope Score-Statistics

	Mean	Standard deviation	Standard Error	T value	P value and Significance
Pair 1 Base-3ms	3.78	1.99	0.66	5.706	0.001 (HS)
Pair 2 Base-6ms	7.22	1.64	0.55	13.200	0.001 (HS)
Pairs 3 Base-1yr.	8.71	1.89	0.71	12.200	0.001 (HS)
Pair 4 Base-2yr	8.33	1.37	0.56	14.940	0.001 (HS)
Pair 5 Base-3yr.	8.33	2.08	1.20	6.934	0.02 (S)

group of ethmoid cells and a middle meatal antrostomy. The postoperative care included betamethasone drops and saline nasal douches and a simple nasal toilet, where possible. The children were seen at fortnightly intervals for the first two months, monthly intervals for the six months and at six monthly intervals thereafter.

Results

The nasal systemic ailments of the nine children in the study have been vividly elucidated in Table I. All the children had received extensive medical therapy including antibiotic courses, decongestants and steroid nasal sprays and had failed to respond.

Table II shows the cumulative symptom scores before and at specific follow-up periods after surgery for each child. Applying the paired t tests showed highly significant to significant improvements in cumulative scores for all pairs with P values < 0.01 and < 0.001 (Table III). Table IV presents the total endoscopic appearance scores of each patient and table V the statistical analysis depicting significant changes with P values < 0.02 and 0.001 .

The radiological scoring for the group averaged 8.3 for the right side and 8.9 for the left (maximum 12, Lund and Kennedy, 1997). There were two cases with

paradoxical middle turbinates and two with prominent / everted uncinate.

The surgical scoring for the group averaged 3.2 for either side (maximum 7 each). There were two children needing frontal recess clearance, one for polyps and the other for mucocoele and oedematous / polypoid obstruction. None of the children underwent posterior ethmoid clearance or sphenoidotomy or middle turbinate resection. One child with cystic fibrosis died of lung disease in the third year of follow-up.

Discussion

Functional Endoscopic Sinus Surgery (FESS) in children has developed amidst tremendous scepticism and is still gradually evolving. The definitions of sinusitis in all its acute, recurrent acute and chronic manifestations have been clearly put forward by leaders in the field (Lund and Kennedy, 1997). It has become difficult to identify what can be classified recalcitrant sinusitis i. e. that which is not amenable to existing forms of medical management. It is for these cases in children that several authorities in Rhinology have been practising FESS (parsons and Phillips, 1993; Lusk and Muntz, 1990; Duplechain et al, 1991; Wolf et al, 1995).

There are a few prominent studies opposing the practice of FESS in children and one such study is by Mair E et al (1995) on piglets and FESS specimens from children. The study showed significant changes in bone growth evaluated by CT imaging although there was no overt defect in facial skeleton. The authors have also identified mature lamellar bone only after the age of 9 years. With these view in mind, we have performed limited (anterior FESS) surgery in our cases and have tried our best to carry the median age to above 9 years. The other large series have had several patients under age 9, have performed surgery to various extents including complete antero-posterior FESS and have not yet found any significant effects on midfacial bone growth. The 'Great Debate' by Poole

MD (1994) critically attacks the rationale for paediatric FESS. The Lund-Mackay and Kennedy system of scoring for sinusitis has evolved from concerted efforts from leading authorities and is extremely useful to present surgical outcomes. In this day and age of clinical governance and evidence-based medicine, it has been acutely perceived by surgeons and clinicians that there is a need to validate the outcome of every therapeutic intervention. We have here presented the cumulative outcomes of symptoms and endoscopic scores. The system may see a few modifications for paediatric disease and evolve a simple staging classification for rhinosinusitis.

The preliminary results from our modest series have been gratifying especially in the group with cystic fibrosis.

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