

The impact of functional endoscopic sinus surgery on health status*

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SUMMARY

Functional Endoscopic Sinus Surgery (FESS) is a procedure routinely performed for chronic rhinosinusitis. The Glasgow Benefit Inventory (GBI), a post interventional questionnaire with General, Social support and Physical Health subscales, was posted to 121 patients. Seventy seven replies were received (63.6%), 31 of the respondents were female and 46 male. Forty four procedures were performed for nasal polyposis and 33 for sinusitis. Overall, 14 patients had unilateral sinus surgery, 63 had bilateral procedures and the mean follow up period was 28 months (range 6 to 55 months). The GBI scores were mainly positive, indicating a benefit from the procedure. On comparing polyposis and sinusitis scores, the difference in the Total GBI and General Subscale scores indicated a greater benefit for polyp disease ($p=0.045$ and 0.022). No statistical difference was seen on comparing the scores for female vs. male, by age, bilateral vs. unilateral or by follow up period. This study validates FESS as a procedure for rhinosinusitis as it leads to an improvement in quality of life of patients.

Key words: functional endoscopic sinus surgery, Glasgow Benefit Inventory, nasal polyps, rhinosinusitis, quality of life

INTRODUCTION

Rhinosinusitis is a common disorder which affects a significant proportion of the population, with estimates ranging from 7 to 30% (Mackay and Bull, 1997; Piccirillo et al., 2002). With symptoms such as nasal obstruction, rhinorrhoea, facial pain and headaches, rhinosinusitis results in considerable morbidity and deterioration in quality of life, and has social and economic sequelae (Ray et al., 1999). Over the last two decades, Functional Endoscopic Sinus Surgery (FESS) has gained acceptance throughout the world as a procedure believed to improve the symptoms of chronic rhinosinusitis and consequently the general well being of patients suffering from the condition. FESS is now routinely performed across the United Kingdom to treat chronic rhinosinusitis.

However, in an environment of evidence based medicine and in the face of limited resources within the National Health Service, it is important to constantly appraise current practice and to assess the impact of a procedure on the general health of a patient. The Glasgow Benefit Inventory (GBI) was specifically designed as a post interventional questionnaire, for use in otorhinolaryngology (Robinson et al., 1996). For the purpose of the GBI, health status is defined as “the general perception

of well being, including total psychological, social and physical well being” The GBI is a validated questionnaire which is sensitive to any change in health status brought about by a specific event such as a surgical procedure. It has 18 questions; the response to each question is based on a five-point Likert scale ranging from a large deterioration in health status to a large improvement. To help control for response bias, half of the questions have the answers ranging from a large improvement to a large deterioration while the other half range the other way. The GBI also has three subscales built into the format of the questionnaire which measure general benefit (12 questions), the amount of social support (3 questions) and changes in overall physical health status (3 questions) of the patients. Hence the subscales provide further information regarding the nature of benefit experienced by the patient following an intervention (Robinson et al., 1996).

Since we wished to ascertain the overall perceived change in health of our patients following the procedure of FESS, we chose the validated GBI questionnaire.

PATIENTS AND METHODS

All patients who had FESS performed between July 1998 and

July 2002 were included in the study. The senior most author performed all the operations over the above period. One hundred and twenty one patients were identified directly from the hand written theatre registers. The hospital records of the patients were collected and details of name, date of birth, sex and address were extracted. The records were studied to determine the indication for surgery and whether the procedure was unilateral or bilateral. All patients had a preoperative Computerised Tomography (CT) scan of the paranasal sinuses. All procedures included at least uncinectomy, anterior ethmoidectomy and middle meatal antrostomy. The extent of ethmoidectomy and whether sphenoid and frontal sinuses were opened was determined by the CT and intraoperative findings. Postoperatively, all patients were prescribed topical nasal steroids for three months. The GBI was sent to all the patients by post (Appendix 1). A covering letter was enclosed which explained the purpose of the project. A reply paid envelope was included with the questionnaire. The completed GBI forms were scored using the published guidelines. The scores for all scales range from -100 to +100, a positive score indicating an improvement in health status (Robinson et al., 1996). As the data were non parametric, the Mann Whitney U test was used for statistical analysis using the statistical package SPSS V11.5, with the assistance of a medical statistician.

RESULTS

In all, 121 questionnaires were posted and 77 replies received, a response rate of 63.6%. Seven questionnaires were returned as the patients had moved from the addresses available in the hospital records. Of the 77 patients who replied, 31 were female and 46 male. The average age at the time of the procedure was 52 years (range 20-80 years).

Forty four procedures were performed for nasal polyposis and 33 for sinusitis. Overall, 14 patients had unilateral sinus surgery and 63 had bilateral procedures performed. The mean follow up period was 28 months (range 6 to 55 months).

The median total GBI score for the 77 patients was 11.11 (Inter quartile range IQR 0.00, 27.77).

The median subscale scores were:

General subscale score 12.5 (IQR 0.00, 37.5), Social support score 0.00 (IQR 0.00,0.00) and Physical health score 0.00 (IQR -16.66,33.33). There was no statistical difference in the total GBI scores on comparing men and women or according to the age of the patient.

The median total GBI score for the 44 patients who had the procedures performed for polyposis was 18.05 and for the 33 procedures for sinusitis was 5.5. This was statistically significant with a p-value of 0.045. The median General subscale score for polyposis was 25.00 and for sinusitis 8.33 and this was also statistically significant with a p-value of 0.022. For both the Social Support and Physical health scores, the median for

polyposis was 0.00 and for sinusitis 0.00. These were not statistically significant (Table 1A).

The median total GBI score and the subscale scores for bilateral versus unilateral procedures are summarised in Table 1B. None of these was statistically significant. Similarly on comparing follow up of one year and greater than one year, no statistical difference was found, as shown in Table 1C.

DISCUSSION

The purpose of this study was to evaluate the impact of endoscopic sinus surgery on patients. A validated questionnaire was used and administered by post, without seeing the patient. Hence the symptoms of the patients and the surgeon's clinical findings were not correlated. Although this could be said to be a flaw in the study, it could also be seen as an effort to avoid clinical bias and determine the patient perspective after sinus surgery.

In this study, a response rate of 63.6% does introduce bias as one can only guess at the overall results had all the patients responded to the questionnaire. However this response rate is similar to other postal questionnaire studies in rhinology (Bakri et al., 1999; Mehanna et al., 2002), and the findings are still valuable as an indication of the benefit perceived by patients following sinus surgery.

From the results, it is clear that overall, patients feel FESS to be a beneficial procedure as indicated by the total GBI scores being mainly in the positive range. However, the extent of benefit perceived by patients demonstrates considerable individual variation as shown by the inter quartile range. There is also no difference in benefit perceived by men and women or according to age. These findings are comparable to the study performed by Mehanna et al. (2002) which also looked at total GBI scores following FESS.

On comparing procedures for nasal polyposis and sinusitis (Table 1A), the total GBI scores showed a statistical difference ($p=0.045$), thus demonstrating a greater benefit for patients with polyposis. On the General Subscale also, the benefit for polyposis was significantly greater than that for sinusitis ($p=0.04$). This could perhaps be explained by the fact that the main symptom that patients with rhinosinusitis complain of is nasal obstruction (Damm et al., 2002) and nasal polyps cause greater nasal obstruction than sinusitis which is immediately relieved by surgery (Blomqvist et al., 2001), and hence the benefit felt by the patient is also greater than that in sinusitis. There was no statistical difference in the Social Support subscale ($p=0.088$) and Physical Health subscales ($p=0.18$) on comparing patients with sinusitis and polyps indicating a comparable benefit perceived by both groups of patients.

As the main symptoms of chronic rhinosinusitis are nasal

Table 1. Glasgow Benefit Inventory score analysis: * indicates statistical significance, TSS = Total Glasgow Benefit Inventory score, GSS = General Subscale score, SSS = Social Support score, PHS = Physical Health score, IQR = Inter Quartile range

Table 1A. Polyps vs Sinusitis.

	POLYPS n=44		SINUSITIS n=33		MANN-WHITNEY U TEST
	MEDIAN	IQR	MEDIAN	IQR	U & P VALUES
TSS	18.05	0.69,36.11	5.55	-1.39,19.44	U=531.5,p=0.045*
GSS	25.00	1.04,44.79	8.33	0.00,20.83	U=504.5,p=0.022*
SSS	0.00	0.00,0.00	0.00	0.00,0.00	U=593.5,p=0.088
PHS	0.00	-12.50,50.00	0.00	-24.99,33.33	U=598.0,p=0.18

Table 1B. Unilateral vs Bilateral.

	UNILATERAL n=14		BILATERAL n=63		MANN-WHITNEY U TEST
	MEDIAN	IQR	MEDIAN	IQR	U & P VALUES
TSS	15.28	-5.55,22.92	11.11	0.00,30.55	U=424.5,p=0.83
GSS	16.7	-6.2,26.0	12.5	0.00,41.7	U=406.5,p=0.65
SSS	0.00	0.00,0.00	0.00	0.00,0.00	U=429.0,p=0.98
PHS	16.66	-16.66,37.50	0.00	-16.66,33.33	U=387.5,p=0.48

Table 1C. One Year vs One to Four Years.

	UPTO 1 YEAR n=16		1 TO 4 YEARS n=61		MANN-WHITNEY U TEST
	MEDIAN	IQR	MEDIAN	IQR	U & P VALUES
TSS	18.05	-4.86,36.80	11.11	0.00,26.14	U=427.0,p=0.45
GSS	20.83	-6.25,43.75	12.50	0.00,33.33	U=443.0,p=0.58
SSS	0.00	0.00,12.50	0.00	0.00,0.00	U=439.0,p=0.42
PHS	8.33	0.00,33.33	0.00	-16.66,33.33	U=421.5,p=0.40

obstruction, postnasal drip, hyposmia and headache (Damm et al., 2002), it seemed reasonable to assume that bilateral disease would cause greater symptoms than unilateral disease. Hence, surgery would cause greater improvement in symptoms in the bilateral group. However, there was no statistical significance demonstrated on comparing bilateral and unilateral procedures thus showing that the benefit across all subscales is similar whether the surgical treatment is of one side or both (Table 1B). In terms of follow up, again no statistical difference was seen on comparing follow up of up to 1 year with that of up to 4 years, indicating that the benefit from surgery is immediate and lasts for a few years (Table 1C).

In most surveys of patient satisfaction following FESS, an improvement is found in quality of life (Matthews et al., 1991; Schaitkin et al., 1993; Gliklich and Metson, 1997; Senior et al., 1998; Metson & Gliklich, 2000; Damm et al., 2002; Mehanna et al., 2002) The GBI has been used to assess the impact of diverse procedures such as bone anchored hearing aid (Duttet al., 2002), acoustic neuroma surgery (Fahy et al., 2002), tonsillectomy (Bhattacharyya et al., 2001), laser palatoplasty (Banerjee and Dempster, 2000), rhinoplasty (McKiernan et al., 2001) and has therefore been shown to be a reliable tool in the retrospective measurement of quality of life following otolaryngological procedures. The GBI has also recently been

used to assess the impact of FESS where a greater benefit was seen for patients with polyposis rather than sinusitis but no statistical significance was reached (Mehanna et al., 2002). However, there was no breakdown into subscales in the data analysis as in our study, whereby statistically significant differences have been demonstrated. Hence, valuable information has been gathered for imparting to patients and surgeons, which would assist in obtaining informed consent prior to surgery.

In conclusion, this study validates FESS as a procedure for rhinosinusitis as it leads to an improvement in quality of life of patients, and the perceived benefit is greater in patients with nasal polyposis.

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Appendix 1. The sinus surgery health status questionnaire.				
1. Has the result of the sinus operation affected the things you do?				
Much worse 1	A little or somewhat 2	No change 3	A little or somewhat 4	Much better 5
2. Have the results of the sinus operation made your overall life better or worse?				
Much better 5	A little or somewhat 4	No change 3	A little or somewhat 2	Much worse 1
3. Since your sinus operation, have you felt more or less optimistic about the future?				
Much more optimistic 5	More optimistic 4	No change 3	Less optimistic 2	Much less optimistic 1
4. Since your sinus operation, do you feel more or less embarrassed when with a group of people?				
Much more embarrassed 1	More embarrassed 2	No change 3	Less embarrassed 4	Much less embarrassed 5
5. Since your sinus operation, do you have more or less self-confidence?				
Much more self-confidence 5	More self-confidence 4	No change 3	Less self-confidence 2	Much less self-confidence 1
6. Since your sinus operation, have you found it easier or harder to deal with company?				
Much easier 5	Easier 4	No change 3	Harder 2	Much harder 1
7. Since your sinus operation, do you feel that you have more or less support from your friends?				
Much more support 5	More support 4	No change 3	Less support 2	Much less support 1
8. Have you been to your family doctor, for any reason, more or less often, since your sinus operation?				
Much more often 1	More often 2	No change 3	Less often 4	Much less often 5
9. Since your sinus operation, do you feel more or less confident about job opportunities?				
Much more confident 5	More confident 4	No change 3	Less confident 2	Much less confident 1
10. Since your sinus operation, do you feel more or less self-conscious?				
Much more self-conscious 1	More self-conscious 2	No change 3	Less self-conscious 4	Much less self-conscious 5
11. Since your sinus operation, are there more or fewer people who really care about you?				
Many more people 5	More people 4	No change 3	Fewer people 2	Many fewer people 1
12. Since you had the sinus operation, do you catch colds or infections more or less often?				
Much more often 1	More often 2	No change 3	Less often 4	Much less often 5
13. Have you had to take more or less medicine for any reason, since your sinus operation?				
Much more medicine 1	More medicine 2	No change 3	Less medicine 4	Much less medicine 5

14. Since your sinus operation, do you feel better or worse about yourself?				
Much better 5	Better 4	No change 3	Worse 2	Much worse 1
15. Since your sinus operation, do you feel that you have had more or less support from your family?				
Much more support 5	More support 4	No change 3	Less support 2	Much less support 1
16. Since your sinus operation, are you more or less inconvenienced by your sinus problem?				
Much more inconvenienced 1	More inconvenienced 2	No change 3	Less inconvenienced 4	Much less inconvenienced 5
17. Since your sinus operation, have you been able to participate in more or fewer social activities?				
Many more activities 5	More activities 4	No change 3	Fewer activities 2	Many fewer activities 1
18. Since your sinus operation, have you been more or less inclined to withdraw from social situations?				
Much more inclined 1	More inclined 2	No change 3	Less inclined 4	Much less inclined 5

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