

Comparison of external and endonasal dacryocystorhinostomy

M FERETIS, J R NEWTON*, B RAM*, F GREEN

Abstract

Introduction: External dacryocystorhinostomy has been the treatment for nasolacrimal duct obstruction for more than a century. More recently, nasal endoscopy has allowed this procedure to be carried out endonasally.

Aim: The aim of this postal questionnaire study was to compare the health status of patients treated for epiphora by external versus endonasal non-laser dacryocystorhinostomy.

Method: The Glasgow benefit inventory questionnaire, along with an additional, department-based symptomatic questionnaire, was distributed to all patients fitting our criteria.

Results: Satisfactorily completed questionnaires were received from 64 out of 90 patients in the external group and from 30 of 41 patients in the endonasal group. Results indicated positive scores for both groups for all four subscales of the Glasgow benefit inventory. There were no statistically significant differences between results for the external and endonasal procedures. The ocular symptomatology questionnaire results indicated better scores for the external procedure, but this difference did not reach statistical significance.

Key words: Dacryocystorhinostomy; Endoscopy; Lacrimal Duct Obstruction; Outcomes Assessment

Introduction

Epiphora is mainly caused by obstruction of the lacrimal passage.¹ External dacryocystorhinostomy (DCR) has provided the mainstay of treatment for chronic dacryocystitis and nasolacrimal duct obstruction for over a century. The technique, originally devised by Toti and modified by Dupuy-Dutempt *et al.*, involves the creation of an anastomosis between the lacrimal sac and nasal cavity proximal to the site of obstruction.² The endonasal approach did not gain popularity among surgeons until nasal endoscopy was devised, much later in the twentieth century.³

Using the endonasal approach, the DCR opening can be created by a variety of methods, involving power drills, laser, chisels or bone rongeurs.^{3,4} The procedure's main indication is for distal lacrimal blockage.

The success rate of external DCR in the literature has often been reported to be better than that of the endonasal approach (89–95 per cent vs 75–90 per cent, respectively).^{4–7} The advent of extended applications for endoscopic sinus surgery has resulted in the endonasal approach being used more frequently, due to several distinct advantages over the external

approach (such as avoidance of a facial scar and shorter operating time).^{4–6}

The Glasgow benefit inventory questionnaire was originally devised in 1996 by Robinson *et al.*, and has been validated for providing accurate descriptions of post-intervention health status in patients undergoing various otolaryngological and ophthalmological procedures.^{8–12} In the present study, the Glasgow benefit inventory questionnaire was accompanied by an additional questionnaire addressing specific ocular symptomatology, in order to ascertain subjective, organ-specific results as well as an indication of patients' overall quality of life (Appendix 1).

The aim of this postal questionnaire study was, firstly, to measure the overall benefit perceived by patients from DCR, and, secondly, to make a subjective comparison of the external versus endonasal approaches.

Materials and methods

In the authors' health region, all patients suffering from epiphora with or without recurrent dacryocystitis were referred by general practitioners to the

From the Departments of Ophthalmology and *Otolaryngology, Aberdeen Royal Infirmary, Scotland, UK.
Presented at the Scottish Otolaryngology Society Winter Meeting, 11 May 2007, Dunkeld, Scotland, UK.
Accepted for publication: 25 March 2008. First published online 20 May 2008.

ophthalmology department. Pre-operative diagnosis of the level of blockage was based on syringing and probing of the lacrimal duct. For cases of suspected canalicular obstruction rather than functional obstruction, a dacryocystogram was conducted to confirm this diagnosis and to determine the level of obstruction. Cases of proximal obstruction (i.e. common canalicular and single canalicular) were treated by the external approach in the ophthalmology department. These patients were excluded from the study. Patients with distal blockage (i.e. lacrimal sac and nasolacrimal duct) were counselled appropriately and offered a choice of either an external procedure or referral to the otolaryngology service for an endoscopic DCR. These patients made up the study group.

A total of 131 patients were included in the study. Ninety patients underwent an external DCR and 41 an endonasal DCR. Patients' names and home addresses were obtained from the databases of the ophthalmology and otolaryngology departments of the Aberdeen Royal Infirmary. Patient confidentiality was maintained by ensuring that patients' names and other personal details did not appear anywhere in the study or in the questionnaires used to obtain results.

Between 2004 and 2007, 90 patients (undergoing 102 operations, both primary and revision) were admitted to the ophthalmology department for an elective external DCR under general anaesthesia, under the care of one consultant with a special interest in oculoplastic surgery. These patients comprised 34 men and 56 women, with a mean age of 64 years (range, 35–91 years). The average time between patients undergoing the procedure and receiving the mailed questionnaire was 17 months (range, two to 33 months).

The 41 patients in the (non-laser) endonasal DCR group underwent the procedure under general anaesthesia, under the care of a single consultant ENT surgeon. These patients comprised 18 men and 23 women, with a mean age of 62 years (range, 40–86 years). The average time between patients undergoing the procedure and receiving the questionnaire was 18 months (range, two to 60 months).

Patients whose names appeared more than once in the hospital's database for DCR were only contacted once; hence, we did not take each operation as a different case. No other exclusion criteria were set.

An envelope was sent out to both patient groups, containing the Glasgow benefit inventory questionnaire and an additional, department-based questionnaire addressing ocular symptomatology (using a five-point Likert scale, similar to the Glasgow benefit inventory) (See Appendix 1). A pre-stamped envelope was included to encourage an increased response rate.

Results from the completed Glasgow benefit inventory and ocular symptomatology questionnaires were compiled using an Excel spreadsheet.

Both patient groups' responses, for both questionnaires, were transferred onto a scale ranging from –100 to +100, the latter being the maximal benefit potentially achieved by patients, as suggested by Robinson *et al.*⁸

All data received were analysed with the Statistical Package for the Social Sciences version 15 software,

using the Mann–Whitney U test for non-parametric data analysis. Statistical significance was defined as $p < 0.05$.

Results and analysis

Sixty-four out of the 90 patients from the external DCR group returned fully completed questionnaires (response rate, 71.1 per cent). A further three questionnaires from this group were also received back but were considered to be invalid, as two did not have all the questions answered and the third was returned by relatives after the patient had died.

The response rate of the endonasal DCR group was 73.2 per cent, with 30 out of 41 patients returning valid questionnaires. (Since endonasal DCR leaves no external scar, these patients were given a score of five out of five for this particular question in the ocular symptomatology questionnaire.)

External group

For the whole cohort of 64 patients who had undergone external DCR surgery within the past 33 months, the median value for the total Glasgow benefit inventory score was +9.7 (interquartile range (IQR) –2.08 to +43.7) and the mean value was +18.5. The median value for the general subscale score was +16.67 (IQR 0.000 to +54.1), while the mean value was +23.9. The median value for the social subscale score was 0.000 (IQR, 0.00 to +16.7), while the mean value was +6.25. Finally, the median value for the physical health score was 0.000 (IQR, 0.000 to +16.7), while the mean value was +6.25.

The external DCR group gave a median value for the ocular symptomatology questionnaire of +50.000 (IQR, 33.333 to 83.333) and a mean value of +50.555.

Endonasal group

The median value for total Glasgow benefit inventory score for the endonasal DCR group was +12.50 (IQR, 0.000 to +38.888), while the mean value was 18.7. The median value for the general subscale score was +16.666 (IQR, 0.000 to +45.833), while the mean value was 22.2. The median value for the social subscale score was 0.000 (IQR, 0.000 to +4.170), while the mean value was 5. Finally, the median value for the physical health score was +16.666 (IQR, 0.000 to +37.50), while the mean value was 18.3.

The endonasal DCR group gave a median value for the ocular symptomatology questionnaire of +50.000 (IQR, –16.667 to +70.833) and the mean value was +34.444.

Comparison

The four separate Glasgow benefit inventory scores for the external and endonasal DCR groups were compared, as shown in Figure 1. Statistical analysis of the differences between the two groups was performed using the Mann–Whitney U test, with the following results: total score, $p = 0.82$; general score, $p = 0.95$;

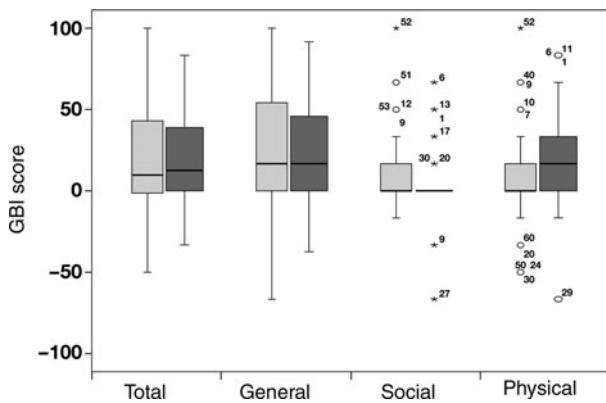


FIG. 1

Glasgow benefit inventory (GBI) scores for external vs endonasal dacryocystorhinostomy (DCR). Light grey = external DCR; dark grey = endonasal DCR; star plots = extreme outlying values; oval plots = outlying values

social score, $p = 0.39$; and physical score, $p = 0.08$. All p values were found to be greater than 0.05; thus, no difference reached statistical significance.

The two groups' results for the ocular symptom questionnaire are compared in Figure 2. The differences between these results also did not reach statistical significance ($p = 0.08$).

Discussion

Post-operative assessment of patients' health status is an important requirement of contemporary medicine and a component of clinical audit.⁸ Dacryocystorhinostomy is an elective procedure which aims to alleviate epiphora. Although it is now widely accepted that external DCR is the 'gold standard' procedure for treating epiphora, due to higher functional success rates, many surgeons prefer to use the endonasal approach as it has several distinct advantages over the external procedure.¹³ These include a shorter operating time with better haemostasis, less post-operative pain relief requirement, no cutaneous scar, no risk to medial canthal structures, and, lastly,

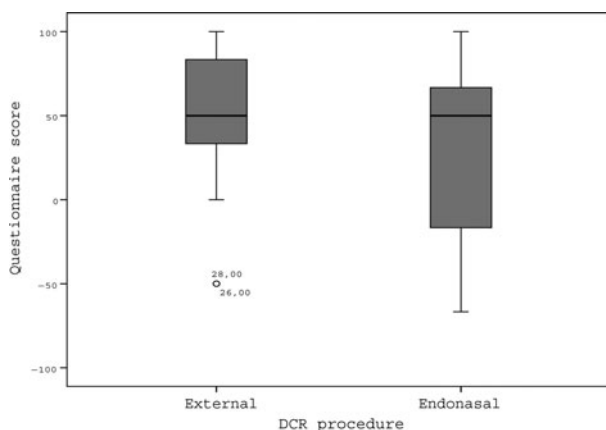


FIG. 2

Ocular symptomatology questionnaire results for external vs endonasal dacryocystorhinostomy (DCR). Oval plot = outlying values

potential for the procedure to be performed as a day case under local anaesthetic.¹² Other additional factors may affect the choice of approach, such as patient co-morbidities, underlying lacrimal pathology, previous nasal surgery, the individual surgeon's experience and even operating costs.^{7,13,14}

We believe that it is difficult to assess the published success rates of lacrimal surgery, because different studies use varying methods to define success and to select patients. Such assessment is made even more challenging when differing surgical techniques are employed by two separate specialties, each of which may have a vested interest in appearing more successful. For these reasons, we chose to assess patients' health status using both the Glasgow benefit inventory and an ocular symptomatology questionnaire, in order to enable a more direct assessment of physical improvement.

The Glasgow benefit inventory was used because of its validated sensitivity in detecting benefit after various otolaryngological and ophthalmological procedures.^{8,11,12} This research tool has been used by Banerjee and Dempster to assess patients' quality of life following laser palatoplasty, and by Konstantinidis *et al.* to evaluate patients' quality of life following septorhinoplasty.^{9,10} Two previous studies have used the Glasgow benefit inventory to evaluate patients' health status following DCR surgery.^{11,12} The Glasgow benefit inventory questionnaire has 18 questions and can be completed by most subjects in around five minutes. Each question response is rated on a five-point Likert scale, ranging from a large deterioration in status to a significant improvement (see Appendix 2). We acknowledge that the Glasgow benefit inventory is not an ideal tool for examining the quality of life of elderly patient groups such as our two study groups. Nevertheless, it is a validated research tool, and we considered it to be the most appropriate such tool for this study.

In order to avoid response bias, half of the Glasgow benefit inventory questionnaire answers are ranged from a large improvement to a large deterioration, and the other half vice versa. Three additional subscales are also included, with 12 questions on general health, three on physical health and three on social health. This provides additional information on the nature of the health change experienced.

Data analysis confirmed that both external and endonasal DCR improved patients' quality of life. This is obviously reassuring, and complements previous research. The mean total Glasgow benefit inventory scores gathered from the two study groups (+18.5 for external DCR and +18.7 for endonasal DCR) are comparable to those published by Robinson *et al.* and Bakri *et al.*^{8,12} Statistical analysis showed that the two interventions had a similar, beneficial impact on patients' health status. The physical health scores and social scores reported by the endonasal DCR group seemed to be higher than those reported by the external DCR group, but neither difference was significant on statistical analysis.

The ocular symptomatology questionnaire has not been validated but is a clinically tested tool used extensively by the Aberdeen Royal Infirmary

ophthalmology department. No appropriate, validated symptomatology scores have been reported in the literature; however, similar five-question scales have been previously used to assess operative DCR success.¹² The ocular symptomatology scores reported by external DCR group patients were higher than those reported by the endonasal DCR patients (mean scores +50.555 and +34.444, respectively). Again, this difference failed to reach statistical significance, indicating that ocular symptoms occurred irrespective of the intervention undergone. It is worth noting that the mean values for the two separate questionnaires were positive, demonstrating a correlation between ocular symptomatology and post-operative health status.

- **External dacryocystorhinostomy (DCR) has been the mainstay of treatment for chronic dacryocystitis and nasolacrimal duct obstruction for over a century**
- **The success rate of external DCR has often been reported as being better than that of the endonasal approach (89–95 per cent and 75–90 per cent, respectively)**
- **This study used the Glasgow benefit inventory to compare outcomes for patients undergoing endonasal vs external DCR**
- **Both groups reported positive scores for all four subscales of the Glasgow benefit inventory. There were no statistically significant differences between reported results for the external and endonasal procedures**

The authors acknowledge potential weaknesses in the study methodology. Using the Glasgow benefit inventory and symptomatology questionnaires on elderly patients several years after the operations is not ideal, and patients' recall may not be perfect. In addition, an elderly patient population's quality of life may deteriorate with advancing age, irrespective of any clinical intervention. A future prospective study would be very valuable.

Conclusion

We conclude that both external and endonasal DCR improve patients' quality of life and ocular symptomatology, as measured by the questionnaires used. Treatment options should always be discussed with patients so that they can make well informed decisions. The endonasal approach carries certain advantages, e.g. regarding facial scarring and post-operative discomfort, but both approaches offer a high chance of symptomatic success.

References

- 1 Tanabe T, Ogura M, Kihara K, Kitahara S. Endonasal laser dacryocystorhinostomy in outpatient clinic. *Intern Congress Series* 2003;**1240**:967–70

- 2 Woog JJ, Metson R, Puliafito CA. Holmium:YAG endonasal laser dacryocystorhinostomy. *Am J Ophthalmol* 1993;**116**:1–10
- 3 Bartley GB. Perspectives: the pros and cons of laser dacryocystorhinostomy. *Am J Ophthalmol* 1994;**117**:103–6
- 4 Hartikainen J, Antila J, Varpula M, Puuka P, Seppa H, Grenamn R. Prospective randomised comparison of endonasal endoscopic dacryocystorhinostomy and external dacryocystorhinostomy. *Laryngoscope* 1998;**108**:1861–6
- 5 Dolman PJ. Comparison of external dacryocystorhinostomy with nonlaser endonasal dacryocystorhinostomy. *Ophthalmol* 2003;**110**:78–84
- 6 Cokkesser Y, Evereklioglu CEM, Hamdi ER. Comparative external versus endoscopic dacryocystorhinostomy: results in 115 patients (130 eyes). *Otolaryngol Head Neck Surg* 2000;**123**:488–91
- 7 Onerci M, Orhan M, Ogretenoglu O, Irkec M. Long-term results and reasons of failure of intranasal endoscopic dacryocystorhinostomy. *Acta Otolaryngol* 2000;**120**:319–22
- 8 Robinson K, Gatehouse S, Browning GG. Measuring patient benefit from otorhinolaryngological surgery and therapy. *Ann Otol Rhinol Laryngol* 1996;**105**:415–22
- 9 Konstantinidis I, Triaridis S, Printza A, Triaridis A, Nousios G, Karagiannidis K. Assessment of patient satisfaction from septo-rhinoplasty with the use of Glasgow Benefit Inventory and Nasal Symptom questionnaire. *Acta Otolaryngol Bel* 2003;**57**:123–9
- 10 Banerjee A, Dempster JH. Laser palatoplasty: evaluation of patient status using the Glasgow Benefit Inventory. *J Laryngol Otol* 2000;**114**:601–4
- 11 Ho A, Sachidananda R, Carrie S, Neoh C. Quality of life assessment after non-laser endonasal dacryocystorhinostomy. *Clin Otolaryngol* 2006;**31**:399–403
- 12 Bakri SJ, Carney AS, Robinson K, Jones NS, Downes RN. Quality of life outcomes following dacryocystorhinostomy: external and laser techniques compared. *Orbit* 1999;**18**:83–8
- 13 Mirza S, Al-Barmani A, Douglas SA, Bearn MA, Robson AK. A retrospective comparison of endonasal KTP laser dacryocystorhinostomy versus external dacryocystorhinostomy. *Clin Otolaryngol* 2002;**27**:347–51
- 14 Tarbet KJ, Custer PL. External dacryocystorhinostomy, surgical success, patient satisfaction and economic cost. *Ophthalmol* 1995;**102**:1065–70

Appendix 1. Ocular symptom questionnaire

- (1) What do you think the overall result of the operation has been?
 - Complete success 5
 - Moderate improvement 4
 - Slight improvement 3
 - No improvement 2
 - Worse than before 1
- (2) How severe was the pain that you experienced after your operation?
 - None 5
 - Pain for less than a week 4
 - Pains for less than 2 weeks 3
 - Persistent moderate pain 2
 - Severe pain 1
- (3) How much eye watering have you experienced after the operation?
 - None 5
 - Intermittent eye watering 4
 - Occasional eye watering 3
 - No change 2
 - Frequent eye watering 1
- (4) How much trouble has the scar given you?
 - No trouble 5
 - Little trouble 4

Occasional trouble 3
Frequent trouble 2
Almost daily trouble 1
Total score: /20

Appendix 2. Example of five-point Likert scale used in Glasgow benefit inventory

Since your DCR 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

Address for correspondence:
Mr J R Newton,
17 Queens Avenue,
Aberdeen AB15 6WA, Scotland, UK.

E-mail: jnewton59@hotmail.com

Mr J R Newton takes responsibility for the integrity of the content of the paper.
Competing interests: None declared
