

External dacryocystorhinostomy in consultants and fellows - a comparison of the causes of failure

Sullivan L, Fearnley T, Al-Maskari A, El-Hindy N, Kalantzis G, Chang BY

Ophthalmology Department, St James University Hospital, Beckett Street, Leeds, United Kingdom.

Abstract

Purpose: Failure of primary dacryocystorhinostomy (DCR) often requires revision surgery to inspect the cause of failure and re-establish anatomic patency. This study aims to specifically compare the anatomical causes of failure noted during revision DCR of primary external DCR (EX-DCR) and compare the difference between consultants and fellows.

Methods: A retrospective review of 37 patients who underwent revision of a primary external approach DCR over a 7-year-period in a University Hospital. All primary surgery was performed by either a consultant surgeon or senior oculoplastic fellow. Details of the initial pathology prior to primary DCR and grade of operating surgeon were collected along with perioperative surgical findings. The cause of failure of the initial surgery was classified according to perioperative findings. Failure was classified as either inappropriately sized/located ostium or fibrous/membranous soft tissue obstruction of the newly created ostium.

Results: The cause of failure of the initial surgery was soft tissue obstruction in 43.3% and an inappropriately sized/located ostium in 56.7%. In those patients whose primary surgery was performed by a consultant, 73.3% were found to have a soft tissue obstruction and 26.7% were found to have an inappropriately sized/located ostium. In contrast, if initial surgery was performed by a fellow, 22.7% were found to have a soft tissue obstruction and 77.3% an inappropriately sized/located ostium ($p=0.002$).

Conclusions: Where the primary surgeon has been a trainee there is a trend toward inadequately sized or located ostium being the most likely causative factor in failure of primary EX-DCR. Hippokratia 2015; 19 (3): 216-218.

Keywords: External dacryocystorhinostomy, consultant, fellow, causes of failure, revision surgery

Corresponding Author: Mr Liam Sullivan, 25 Blinco Grove, Cambridge, CB17TP, United Kingdom, tel: +447814254731, e-mail: drliamsullivan@gmail.com

Introduction

Dacryocystorhinostomy (DCR) is the gold standard operation for the treatment of acquired nasolacrimal duct obstruction. It involves bypassing the nasolacrimal duct blockage by creating a direct conduit from the lacrimal sac to the nasal cavity. DCR can be performed either externally (EX-DCR) or endonasally (ENDO-DCR). Both external and endonasal DCRs are well established procedures with published modern descriptions dating as early as 1904¹. Results from both approaches demonstrate comparable success rates in terms of anatomical patency and symptomatic relief². Failure of primary DCR often requires revision surgery to inspect the cause of failure and re-establish anatomic patency. This study aims to specifically compare the anatomical causes of failure noted during revision DCR of primary external DCR and compare the difference between consultants and fellows.

Materials and Methods

We conducted a retrospective review of medical and surgical records of all patients who underwent revision of a primary external approach DCR between 2003 and

2010 at Leeds Teaching Hospitals NHS Trust, United Kingdom. All primary surgery was performed by either a consultant surgeon or senior oculoplastic fellow.

Details of the initial pathology prior to primary DCR and grade of operating surgeon were collected. The cause of failure of the initial surgery was classified according to perioperative findings. Failure was classified as either inappropriately sized/located ostium or fibrous/membranous soft tissue obstruction of the newly created ostium. All primary EX-DCR included passage of bicanalicular O'Donoghue tubes, which were subsequently removed two months postoperatively. Exclusion criteria included patients who had pre-existing proximal canalicular stenosis or blockage and patients who underwent external DCR with retrograde intubation due to canalicular disease. These patients were excluded as it was anticipated that lacrimal bypass tube surgery would be required if their initial surgery failed to provide symptomatic relief.

Revision surgery was performed by a single consultant surgeon with patients being given the option of either an external or endonasal approach.

In order to compare our findings with the primary

success of DCR surgery amongst consultants and fellows, we also reviewed all cases during the study period and classified the primary success in consultants and fellows.

The work was deemed to not require ethical approval by the St James Ophthalmology department audit lead as data was collected as an audit in 03/10/2011. The study was performed with informed consent and following all the guidelines for experimental investigations required by the Institutional Review Board or Ethics Committee of which all authors are affiliated.

Exact Fisher's test was used to calculate p values. The null hypothesis assumed that there is no difference in the type of anatomical failure of primary EX-DCR regardless of whether the surgery was performed by a consultant or fellow. Statistical analysis was carried out using Microsoft Excel™ (Microsoft, UK).

Results

During the study period, 436 patients had EX-DCR and 204 (46.8%) operations were performed by a consultant and 232 (53.2%) were performed by a fellow. Primary failure was seen in 37 (8.5%) and these patients went on to have revision surgery. The primary success rate in consultants was 92.6% and the primary success rate in fellows was 90.5%, with an overall success rate of 91.5%.

Between 2003 and 2010, 37 patients (18 male and 19 female) underwent revision DCR. Indications for their initial primary EX-DCR was primary acquired nasolacrimal duct obstruction; two of these patients had episodes of chronic dacryocystitis. All failed primary EX-DCR were irrigated prior to revision and had anatomical block resulted in permanent epiphora. Age at revision surgery ranged from 30 to 86 years (mean: 63 years). There were 22 patients who had revision via an external approach, 14 who had revision via an endonasal approach and one patient required a combined approach. The period between primary DCR and revision DCR ranged from 6 to 323 months (mean: 56 months).

Table 1 shows the causes of failure of primary EX-DCR amongst all grades of surgeon. Sixteen patients (43.3%) were found to have a soft tissue obstruction and 21 (56.7%) an inappropriately sized/ located ostium.

There is no statistically significant difference ($p=0.41$). In 10 cases where there was a mixed picture of both soft tissue and bony obstruction, it was deemed perioperatively that the main reason for failure was bony obstruction or an inadequately placed ostium.

Table 2 shows the cause of failure of primary EX-DCR separated by grade of surgeon. In those patients whose primary surgery was performed by a consultant, 11 patients (73.3%) were found to have a soft tissue obstruction and four (26.7%) an inappropriately sized/located ostium. In those patients whose initial surgery was performed by a fellow, five patients (22.7%) were found to have a soft tissue obstruction and 17 (77.3%) an inappropriately sized/ located ostium. The difference in the anatomical cause of failure between the two groups of surgeon is statistically significant ($p=0.002$) with inappropriately sized/ located ostium being a significantly more frequent occurrence in the hands of Fellow surgeons.

Discussion

EX-DCR is considered to be a successful and predictable operation. It continues to be widely performed and remains the most common technique for DCR in the UK². Success and failure rates have been widely published³⁻⁷. In considering anatomical failure, we aim to specifically look at the difference in causes of failure between grades of surgeon in this study.

Revision DCR gives the surgeon an opportunity to directly observe the causes of anatomical failure and can give insight into the previous surgery performed. We do not believe that there are any current studies in the literature that compare the causes of failure in primary external DCR between surgeons at consultants and fellow grade.

Reported causes of failure vary among published studies. Ari et al⁸ reported their surgical findings in 28 revisions of primary EX-DCR. Of these cases, 86% had an inadequate ostium size or location or obstruction by hypertrophic nasal mucosa and granulation tissue, 10% had thickening of the nasal septum and 4% had nasal polyps. However, all 28 cases in this series had a primary pre-operative pathology of recurrent dacryocystitis, which is likely to be associated with more pre-operative granulation tissue. Konuk et al⁹ reported a high incidence

Table 1: Causes of failure of primary external dacryocystorhinostomy amongst all grades of surgeon.

Cause of Failure: percentage (number)		Total	Significance
Fibrous/ membranous soft tissue obstruction	Inappropriately sized/located ostium		
43.3% (16)	56.7% (21)	100% (37)	$p=0.41$

Table 2: Comparison of cause of failure in external dacryocystorhinostomy between consultant and fellow.

Grade	Cause of Failure: percentage (number)		Total % (number)	Significance
	Fibrous/membranous soft tissue obstruction	Inappropriately sized/located ostium		
Consultant	73.3% (11)	26.7% (4)	100% (15)	$p=0.002$
Fellow	22.7% (5)	77.3% (17)	100% (22)	

of ostium related primary DCR failure with 80 out of 83 cases noted to have an ostium of inappropriate size or location. 45 out of 83 cases in the same group of patients had fibrosis, and 23 out of 83 patients had canalicular stenosis.

Paik et al¹⁰ performed nasal endoscopic examination on their cohort of patients prior to revisional surgery, allowing them to formulate seven categories of soft tissue obstruction preoperatively. This stratification was then reduced to four perioperative findings of failure, of which inappropriately sized or located ostium made up only 8%. The remaining causes of failure were all soft tissue in nature. In this study, the results were of a single consultant equivalent surgeon and this would appear to agree with our data which suggests that this grade of surgeon rarely sees inappropriately sized or located ostium as a cause of failure for primary EX-DCR in their hands.

Studies have previously compared consultants to trainees following DCR surgery. Pandya et al¹¹ compared the resolution of symptoms in patients (either none, partial or full) in a retrospective review of 338 cases and found that there was no statistical difference between post-operative success whether the primary surgery was performed by a consultant or trainee. Jutley et al¹² observed that there was no statistically significant difference in trainee versus consultant outcomes in their retrospective patient satisfaction survey of 282 consecutive patients who had ENDO-DCR.

Our study is limited by small numbers, retrospective design and observer bias, but highlights a key difference in the causes of failure between consultants and trainees. Where the primary surgeon has been a trainee there is a trend toward inadequately sized or located ostium being the most likely causative factor. It is likely that the insufficient amount of bone removed during ostium creation in this cohort of failed DCRs may also provide a scaffold for additional soft tissue growth to compound the obstruction.

Our success rates were similar between consultants and trainees. Despite overall functional success and patient satisfaction being previously reported as equal between consultants and trainees^{11,12}, we believe that our findings are important because they suggest a different aetiology for the failure and a specific area where the performance of trainees undertaking this surgery could be improved. If outcomes are truly the same between different grades of surgeon, then the cause of failure may be purely of academic interest. However, both studies looking at differences in success were retrospective and non-randomised. It is often the case that trainees are given

the less complicated cases and that the true difference in success rates between consultants and trainees may well be masked by case complexity and is thus not identified.

EX-DCR is a widely performed and taught lacrimal operation. Our study highlights the difference in the cause of failure between fellows and consultants. We advise current fellows of the importance of striving to create an adequately sized and located ostium during EX-DCR and stress the role that consultants can play in ensuring that fellows are closely supervised during this critical step of the surgery.

Conflict of interest

None of the authors report any conflict of interest.

References

1. Yakopson VS, Flanagan JC, Ahn D, Luo BP. Dacryocystorhinostomy: History, evolution and future directions. *Saudi J Ophthalmol.* 2011; 25: 37-49.
2. Gauba V, Islam T, Saleh GM, Zuberbuhler B, Vize C. The practice of dacryocystorhinostomy (DCR) surgery by ophthalmologists in the United Kingdom (UK). *Orbit.* 2008; 27: 279-283.
3. Ben Simon GJ, Joseph J, Lee S, Schwarcz RM, McCann JD, Goldberg RA. External versus endoscopic dacryocystorhinostomy for acquired nasolacrimal duct obstruction in a tertiary referral center. *Ophthalmology.* 2005; 112: 1463-1468.
4. Yung MW, Hardman-Lea S. Analysis of the results of surgical endoscopic dacryocystorhinostomy: effect of the level of obstruction. *Br J Ophthalmol.* 2002; 86: 792-794.
5. Dolman PJ. Comparison of external dacryocystorhinostomy with nonlaser endonasal dacryocystorhinostomy. *Ophthalmology.* 2003; 110: 78-84.
6. Woog JJ, Kennedy RH, Custer PL, Kaltreider SA, Meyer DR, Camara JG. Endonasal dacryocystorhinostomy: a report by the American Academy of Ophthalmology. *Ophthalmology.* 2001; 108: 2369-2377.
7. Lee DW, Chai CH, Loon SC. Primary external dacryocystorhinostomy versus primary endonasal dacryocystorhinostomy: a review. *Clin Experiment Ophthalmol* 2010; 38: 418-426.
8. Ari S, Kürsat Cingü A, Sahin A, Gün R, Kinis V, Çaça I. Outcomes of revision external dacryocystorhinostomy and nasal intubation by bicanalicular silicone tubing under endonasal endoscopic guidance. *Int J Ophthalmol.* 2012; 5: 238-241.
9. Konuk O, Kurtulmusoglu M, Knatova Z, Unal M. Unsuccessful lacrimal surgery: causative factors and results of surgical management in a tertiary referral center. *Ophthalmologica.* 2010; 224: 361-366.
10. Paik JS, Cho WK, Yang SW. Comparison of endoscopic revision for failed primary external versus endoscopic dacryocystorhinostomy. *Clin Experiment Ophthalmol.* 2013; 41: 116-121.
11. Pandya VB, Lee S, Bengier R, Danks JJ, Kourt G, Martin PA, et al. External dacryocystorhinostomy: assessing factors that influence outcome. *Orbit.* 2010; 29: 291-297.
12. Jutley G, Karim R, Joharatnam N, Latif S, Lynch T, Olver JM. Patient satisfaction following endoscopic endonasal dacryocystorhinostomy: a quality of life study. *Eye (Lond).* 2013; 27: 1084-1089.