

## SCIENTIFIC CORRESPONDENCE

## External dacryocystorhinostomy for the treatment of acquired partial nasolacrimal obstruction in adults

Y M Delaney, R Khooshabeh

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**Aim:** To determine the long term success of external dacryocystorhinostomy (DCR) in adults with acquired partial nasolacrimal obstruction.

**Methods:** A retrospective study of 50 external dacryocystorhinostomies with silicone intubation performed for partial nasolacrimal obstruction, was undertaken. Preoperative lacrimal scintigraphy divided drainage abnormalities into presac or postsac delays. Postoperative success was determined by lacrimal patency to irrigation, a positive dye test on nasal endoscopy and subjective resolution of epiphora. Statistical analysis was performed using the Fisher exact test.

**Results:** A patent DCR system to irrigation and a positive dye test was achieved in 90% of procedures. At an average of 3.6 months' follow up, subjective success was reported in 84% of cases—91% for postsac and 67% for presac delays. At 3 years' follow up success had declined to 70% overall and to 80% and 47% for postsac and presac occlusions respectively. There was a statistically significant association between a presac delay and postoperative recurrence of epiphora,  $p = 0.04$ .

**Conclusion:** External DCR with silicone intubation is an effective procedure for partial nasolacrimal obstruction. Presac delays do significantly less well and further studies are necessary to evaluate the best type of surgery for these patients.

External dacryocystorhinostomy (DCR) is well established as the standard surgical procedure for the treatment of complete nasolacrimal obstruction in adults, consistently yielding success rates of over 90%.<sup>1,2</sup> The purpose of this study was to determine the success of external DCR in patients with partial nasolacrimal obstruction (PNLO).

## MATERIALS AND METHODS

## Patients

We reviewed the medical records of 49 patients who underwent 50 external DCRs with silicone intubation, between January 1995 and December 2000. Age and sex of the patient, the level of nasolacrimal obstruction as determined by dacryoscintigraphy, the surgical procedure, the timing of silicone tube removal, and length of follow up were documented. Postoperative success was evaluated by DCR patency to irrigation, a positive dye test on nasal endoscopy, and subjective resolution of epiphora. Statistical analysis was undertaken using the Fisher exact test and a  $p$  value of  $<0.05$  was considered statistically significant.

## Questionnaire

Forty nine patients completed a telephone questionnaire to evaluate the long term postoperative improvement of their epiphora. The patients were asked to quantify their symptoms

as follows; (A) no improvement, tearing is the same or worse, (B) slight improvement, but still tears both indoors and outdoors, (C) significant improvement, but persistent slight tearing outdoors, (D) complete resolution of tearing, both indoors and outdoors. Patients self reporting as A or B were defined as "failures," C or D as "successes."

## Definition of partial NLO

Patients were examined carefully for lid margin disease, any cause of lacrimal hypersecretion, tear film instability, blink or lid inefficiency, punctal/lid malposition or laxity, and co-existing sinus or nasal pathology. Patients with epiphora were diagnosed with PNLO in the presence of (a) a negative Jones I and positive Jones II dye test, and (b) a freely patent nasolacrimal system to irrigation with minimum or no reflux from the upper canaliculus or punctum and no evidence of lid malposition or lacrimal hypersecretion. True functional nasolacrimal obstructions—that is, facial nerve palsies, were excluded. Patients diagnosed with PNLO were prescribed a 6 week course of ocular and nasal antibiotic/steroid and only if their symptoms continued to persist were they offered lacrimal surgery. Preoperative lacrimal scintigraphy, evaluated by an experienced observer RK, differentiated drainage abnormalities into presac or postsac delays. A presac delay was diagnosed if tracer failed to reach the sac by the end of the dynamic phase. A postsac delay was diagnosed if there was early filling of the sac but it continued to remain full of contrast at the end of the study.

## RESULTS

Fifty lacrimal procedures were performed in 49 patients. Thirteen patients were male and 36 were female. The average age was 62 years, range 21–86 years. The average length of follow up was 36 months, range 11–69 months. Based on the findings at lacrimal scintigraphy, 15 lacrimal systems had a presac delay and 35 systems a postsac delay. The length of follow up was similar in both groups.

## Symptomatic outcome

Symptomatic outcomes at an average of 3.6 and 36 months follow up are summarised in Tables 1 and 2. Initial postoperative success was evaluated at the time of silicone tube removal, an average of 3.6 months following surgery, range 3 weeks to 9 months. Patent DCR systems to irrigation and positive dye testing on nasal endoscopy were achieved in 90% of procedures with 84% ( $n = 42$ ) experiencing complete or very significant reduction in their epiphora. Postsac delays did significantly better with 91% reporting subjective success compared to only 67% of proximal delays. At 3 years' follow up the overall subjective success rate had declined to 70% ( $n = 35$ ). Again the success rate was higher among postsacs at 80%, and lower for presacs at 47%. There was a statistically significant association between symptomatic success and a postsac scintigram, both at 3.6 months,  $p=0.043$ , and at 3 years,  $p=0.040$ . The rate of decline in surgical success was greater

**Table 1** Symptomatic outcome following DCR for presac and postsac PNLO at 3 months (number (%))

	Presac	Postsac
Success	10 (66.6)	32 (91.4)
Failure	5 (33.3)	3 (8.6)

**Table 2** Symptomatic outcome following DCR for presac and postsac PNLO at 3 years (number (%))

	Presac	Postsac
Success	7 (46.6)	28 (80.0)
Failure	8 (53.3)	7 (20.0)

among presacs, with 30% compared to only 12.5% of postsacs experiencing recurrence of epiphora similar to their preoperative status at 3 years' follow up. However, this did not reach statistical significance.

## DISCUSSION

External DCR is a highly successful procedure for complete stenosis of the nasolacrimal duct.<sup>1,2</sup> In contrast, evaluation of its role in the surgical management of patients with functional or partial nasolacrimal system obstruction has been little studied.

From the literature, it appears there are inconsistencies in the terminology employed to describe patients with epiphora whose ducts are patent to syringing. The term "functional obstruction" is confusing as it implies anatomically normal lacrimal passages with a physiological dysfunction.<sup>3</sup> This is clearly not the case as anatomical abnormalities can be identified, either on macrodacryocystography or at exploratory surgery, in the majority of cases.<sup>4</sup> We therefore use the term partial nasolacrimal duct obstruction to describe this group of patients and reserve the term functional obstruction for cases caused exclusively by facial nerve palsy.

Clinically, partial obstruction is implied with a negative primary Jones dye test and a positive secondary dye test.<sup>5-7</sup> However, there can be significant variability in the primary Jones dye test<sup>6,8</sup> and PNLO may be more pragmatically defined as epiphora in the presence of a lacrimal drainage system freely patent to syringing with no or minimum reflux and no evidence of lid malposition or lacrimal hypersecretion.<sup>9</sup>

Wearne *et al*<sup>9</sup> have established the value of scintigraphy in the study of partial obstruction of the nasolacrimal system. They concluded that scintigraphy is more sensitive than DCG in detecting abnormalities in this subgroup of patients. All of our 50 eyes had an abnormal lacrimal scan with either a presac (30%) or a postsac (70%) blockage. Wearne *et al* also found a preponderance of postsac delays, at the sac duct junction or the duct, with the minority, 13%, diagnosed with presac abnormalities. In our experience the main level of blockage was easier to detect in postsac delays. In some cases of presac retention, a minimum volume of tracer of reduced intensity reached the sac after the dynamic phase. Drainage of the entire system was slow so that even when dye reached the sac, subsequent excretion from the sac was very delayed, suggesting the presence of multiple areas of obstruction.

Various surgical techniques have been used to treat PNLO. Balloon dacryocystoplasty has proved disappointing, achieving patency rates of only 25%–50% at 2 year follow up.<sup>10-12</sup> With the addition of silicone intubation and antegrade catheterisation Perry *et al*<sup>13</sup> documented patency rates of 73% and subjective success of 60% but with a shorter follow up time of 6

months. Other authors have reported success with polyurethane stents but long term results are lacking.<sup>14,15</sup> Angrist *et al*<sup>16</sup> found silicone intubation for partial obstruction yielded good results in 73.9% of patients but this does not appear to reflect the experience of others.<sup>7,17</sup>

Overall, our surgical success is considerably higher, achieving 84% subjective success at 3.6 months and 70% at 3 years. All our patients were intubated with silicone tubes. Routinely these were removed at the 3 month follow up visit, provided there was significant symptomatic improvement and/or fluorescein was observed on nasal endoscopy after the patients had been requested to blow their nose. We use silicone intubation in cases of PNLO as both the exact nature and location of the canalicular or nasolacrimal duct disease, and therefore the factors predisposing to their failure, are less well defined than in completely occluded systems.

Presac delays did significantly less well than postsac delays,  $p = 0.04$ . This is not entirely unexpected as the salient pathology in these systems is probably canalicular in origin.<sup>9</sup> Cases with presac retention are also more likely to have a primarily physiological problem compared to distal delays. Rosenstock *et al*<sup>3</sup> have shown that physiological dysfunctions are at most always located in the upper system—lids, punctum, and lacrimal pump—and only rarely in the lacrimal sac.

Postsac delays achieved superior outcomes, with short term results similar to those achieved following external DCR for complete postsac stenosis but with, according to both our own and other authors' results,<sup>1</sup> a greater decline in surgical success over time. Why this should occur in partial compared to complete postsac stenosis is not clear. After external DCR, the sac and duct should cease to exist and instead become incorporated into the nose, thereby bypassing any distal obstruction, be it partial or complete. It is possible that in cases of acquired PNLO, the idiopathic inflammatory process<sup>12</sup> responsible for the obstruction is ongoing and in a small number, canalicular inflammation may subsequently occur, thereby predisposing to common canalicular block, a common cause of DCR failure.<sup>18</sup>

This study shows that in cases of PNLO the differentiation of abnormal scintigrams into presac and postsac delays provides valuable information in predicting surgical success. The majority of partial postsac obstructions (80%), a group clearly identified on scintigraphy, achieve successful results following external DCR. Presac obstructions do significantly less well and further studies are necessary to evaluate the best type of surgery in these patients.

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