

## SCIENTIFIC REPORT

# Is routine biopsy of the lacrimal sac wall indicated at dacryocystorhinostomy? A prospective study and literature review

C Merkonidis, C Brewis, M Yung, M Nussbaumer

*Br J Ophthalmol* 2005;89:1589–1591. doi: 10.1136/bjo.2005.072199

**Objective:** To determine whether routine biopsy of the lacrimal sac wall at dacryocystorhinostomy (DCR) is indicated.

**Methods:** A prospective study and literature review. In 193 consecutive endoscopic DCRs performed on 164 patients (108 females and 56 males) part of the medial wall of the lacrimal sac was sent for histological examination. The mean age of the patients was 64 years with a range of 2.5–89 years. Previous reported series were reviewed.

**Results:** Of the 193 specimens, 44 (23%) showed normal histology, 146 (76%) showed varying degrees of non-specific chronic inflammation, and three (1.2%) showed specific pathology. Of the three specimens that showed specific pathology two showed sarcoidosis and one showed transitional cell papilloma. The two specimens with sarcoidosis were obtained from one patient who underwent bilateral surgery. In this and the six previous reported series only seven of 1294 specimens (0.5%) showed specific pathology, which was definitely not suspected preoperatively or intraoperatively, and only one of these (0.08%) was found to be malignant (a lymphoma).

**Conclusions:** Biopsy of the lacrimal sac wall at DCR is not indicated routinely and is only indicated if there is a reason to suspect pathology other than chronic inflammation preoperatively or intraoperatively.

Lacrimal obstruction may be proximal (single or common canalicular obstruction), distal (sac or duct obstruction), functional, or a combination of these.<sup>1</sup> A diagnosis of functional obstruction is made when syringing and probing demonstrate no obstruction of the lacrimal system and yet the more physiological investigation of scintigraphy demonstrates reduced passage of radiolabelled tracer through the lacrimal system.

The surgical treatment for lacrimal obstruction is dacryocystorhinostomy (DCR) which involves marsupialisation of the lacrimal sac into the nasal cavity. DCR can be performed either externally or endoscopically and the results of both techniques are similar.<sup>2,3</sup>

A Medline search performed by the authors has identified six publications reporting the results of histological examination of specimens taken from the outflow system at DCR. These have shown that lacrimal obstruction is associated with non-specific chronic inflammation of the outflow system in most cases and with specific pathologies in between zero and 14.3% of cases (table 1). These specific pathologies may be inflammatory or neoplastic (table 2). In view of this some authors have advocated routine histological examination of the lacrimal sac at DCR to avoid missing specific pathologies.<sup>4–6</sup>

The senior author (MWY) has been performing endoscopic DCR for patients with proximal, distal, and functional lacrimal obstruction since 1994. We report the results of and discuss the value of routine histological examination of the lacrimal sac at DCR.

## MATERIALS AND METHODS

In 193 consecutive endoscopic DCRs performed on 164 patients between January 1999 and December 2001, a part of the medial wall of the lacrimal sac was routinely sent for histological examination. The DCRs were bilateral in 23 patients. The mean age of the patients was 64 years with a range of 2.5–89 years; 108 were female and 56 were male. The indications for surgery and level of obstruction for these 193 DCRs are shown in table 3.

Preoperative assessment included syringing and probing, dye testing, and (in selected cases) dacryocystography or scintigraphy.<sup>2</sup> At operation, bone of the frontal process of the maxilla was removed to expose the lacrimal duct and sac and the medial wall of the sac was removed with a keratome and through-cutting forceps.<sup>3</sup> The operation was performed under local anaesthetic using a lacrimal fossa block<sup>7</sup> and sedation in 139 cases and under general anaesthetic in 31 cases.

## RESULTS

Of the 193 specimens, 44 (23%) showed normal histology, 146 (76%) showed varying degrees of non-specific chronic inflammation, and three (1.2%) showed specific pathology (table 4). Of the 146 specimens that showed non-specific chronic inflammation a number also showed other changes of the epithelial lining of the sac or duct, including erosion (three), ulceration (two), hyperplasia (five), oncocytic metaplasia (one), flattening of the epithelium (two), thickening of the basement membrane (one), polyp formation (one), and cyst formation (four). Of the three specimens that showed specific pathology, two showed sarcoidosis and one showed transitional cell papilloma (mixed exophytic and inverted type). The two specimens with sarcoidosis were obtained from one patient who underwent bilateral surgery. The cases of the two patients with specific pathology are described below.

### Case 1

A 53 year old woman was referred with a 2 year history of bilateral epiphora. She had a history consistent with rhinosinusitis and examination showed an oedematous nasal mucosa and a superiorly thickened nasal septum. Skin prick testing showed no allergies and a computed tomograph (CT) scan showed no sinus disease. A dacryocystogram showed obstruction of the lacrimal sac on the right. A nasal steroid spray was commenced and a submucosal resection and

**Abbreviations:** DCR, dacryocystorhinostomy

**Table 1** Number and percentage of lacrimal sac specimens with specific pathology and with specific pathology that was unsuspected preoperatively and intraoperatively in seven series of dacryocystorhinostomies

Reference	Patients		Specimens with specific pathology		Specimens with unsuspected specific pathology		Case selection
	No	No	No	%	No	%	
Linberg <sup>5</sup>	13	14	2	14.3	1	7.1	Unselected
Mauriello <sup>11</sup>	44	44	0	0	0	0	Unselected
Tucker <sup>6</sup>	150	162	4	2.5	1	0.6	Unselected
Lee-Wing <sup>10</sup>	166	202	0	0	0	0	Unselected
Anderson <sup>4</sup>	316	377	31	8.2	≥3*	≥0.8*	? Selected*
Bernardini <sup>9</sup>	258	302	10	3.3	0	0	Unselected
Present study	164	193	3	1.6	2	1.0	Unselected
Total	1111	1294	50	3.9	7	0.5	

\*See Discussion.

bilateral endoscopic DCR were performed. At operation both lacrimal sacs were found to be oedematous but otherwise normal and histology of both lacrimal sacs showed sarcoidosis. The patient was subsequently investigated with a chest x ray that showed bilateral hilar lymphadenopathy and angiotensin converting enzyme levels, which were raised. A course of oral corticosteroids was prescribed for the pulmonary sarcoidosis. Three years postoperatively she has no epiphora and has only mild lower respiratory tract symptoms.

### Case 2

A 31 year old woman was referred with a 2 year history of right epiphora. A dye test and scintigram showed delayed emptying of the lacrimal sac and syringing showed a patent lacrimal system. A diagnosis of functional blockage was made and endoscopic DCR was performed. At operation the lumen of the sac and duct were found to be filled with granulation tissue and histology showed a transitional cell papilloma (mixed exophytic and inverted type) of the sac. The remainder of the sac and duct were subsequently removed via a combined endoscopic and external approach. Three years postoperatively there has been no recurrence and it is planned to reconstruct the lacrimal system with a pedicled nasal septal tube.<sup>8</sup>

Of the 193 specimens the obstruction was proximal in 31, distal in 138, mixed in 10, and functional in 15 (table 4). Of the 31 cases with proximal obstruction, histology was normal in 12 and indicated non-specific chronic inflammation in 19. Of the 138 cases with distal obstruction, histology was normal in 27, there was non-specific chronic inflammation in 109, and sarcoidosis in two. Of the 10 cases with mixed obstruction, histology was normal in five and there was non-specific chronic inflammation in five. Of the 15 cases with functional obstruction, histology showed non-specific

chronic inflammation in 14 and transitional cell papilloma in one.

### DISCUSSION

In our series lacrimal obstruction was associated with non-specific chronic inflammation of the lacrimal sac in 146 out of 193 specimens (76%). This is in keeping with previous series and is consistent with a pathophysiology of chronic inflammation leading to epithelial and subepithelial changes and lacrimal obstruction.<sup>4-6 9-11</sup>

Lacrimal obstruction may also be associated with specific pathology. Previous series have shown specific pathology in between zero and 14.3% of specimens (table 1). The most common specific pathologies were sarcoidosis, lymphoma, and papilloma (table 2). Specific pathology was found in 31 out of 377 specimens in Anderson's series (eight sarcoidosis, seven lymphoma, four papilloma, four lymphoplasmacytic infiltrate, two transitional cell carcinoma, one oncocytoma, one granular cell tumour, one adenocarcinoma, one poorly differentiated carcinoma, one plasmacytoma, and one leukaemia)<sup>4</sup>; in 10 out of 302 specimens in Bernardini's series (four sarcoidosis, three squamous papilloma, two lymphoma, one leukaemia)<sup>9</sup>; in four out of 162 specimens in Tucker's series (two lymphoma, one sarcoidosis, one oncocytoma)<sup>6</sup>; and in two out of 14 specimens in Linberg's series (one sarcoidosis and one leukaemia).<sup>5</sup> No specific pathology was found in 44 specimens in Mauriello's series<sup>11</sup> and in 202 specimens in Lee-Wing's series.<sup>10</sup> In our series specific pathology was found in three out of 193 specimens (two sarcoidosis and one transitional cell papilloma). All these series were described as being of unselected, consecutive surgical specimens. However, the specimens in Anderson's series may have been selected as they were identified from laboratory rather than surgical records, and as 10 were from another laboratory and appeared to have a high proportion of specific pathology. Overall, 50 out of 1294 specimens (3.9%) in these seven series showed specific pathology.

The aim of this study was to determine whether biopsy of the lacrimal sac wall at DCR is indicated in all cases or only in those selected cases in which specific pathology is suspected either preoperatively (from the history or examination) or intraoperatively (from the appearance of the lacrimal sac). If biopsy was performed only in selected cases it is possible that specific pathology that was unsuspected preoperatively or intraoperatively might be overlooked. It is therefore important to know in how many specimens with specific pathology this was unsuspected. As described above, specific pathology was identified in four previously published series (table 1). In Lindberg's series,<sup>5</sup> of the two specimens with specific pathology this was unsuspected in one specimen with sarcoidosis. In Tucker's series,<sup>6</sup> of the four specimens with specific pathology this was unsuspected in one specimen with

**Table 2** Type and number of specific pathologies identified in 1294 lacrimal sac specimens in seven series of dacryocystorhinostomies

Pathology	Number	Reference
Sarcoidosis	16	4, 5, 6, 8, present study
Lymphoma	11	4, 6, 8
Papilloma	7	4, 8
Lymphoplasmacytic infiltrate	4	4
Leukaemia	3	4, 5, 8
Oncocytoma	2	4, 6
Transitional cell carcinoma	2	4
Adenocarcinoma	1	4
Granular cell tumour	1	4
Plasmacytoma	1	4
Poorly differentiated carcinoma	1	4
Transitional cell papilloma	1	Present study

**Table 3** Indication for surgery and level of obstruction in 193 dacryocystorhinostomies

Indication for surgery	No	%	Level of obstruction	No
Silent epiphora	163	85	Proximal	31
			Distal	110
			Multiple levels	7
			Functional	15
Recurrent dacryocystitis	13	7	Distal	10
			Multiple levels	3
Pyocele	7	3	Distal	7
Mucocele	10	5	Distal	10

**Table 4** Level of obstruction and histology in 193 dacryocystorhinostomies

	Normal	Chronic inflammation	Specific
Proximal	12	19	0
Distal	27	108	2 (sarcoidosis*)
Multiple levels	5	5	0
Functional	0	14	1 (transitional cell papilloma)
Total	44	146	3

\*Two specimens from one patient.

oncocyoma. In Bernardini's series,<sup>9</sup> of the 10 specimens with specific pathology this was suspected in all specimens. In Anderson's series,<sup>4</sup> of the 31 specimens with specific pathology it was stated this was unsuspected preoperatively in at least eight. However, it was not stated what the nature of the pathology was (except one lymphoma) or whether it was suspected intraoperatively (except two unspecified epithelial tumours and one lymphoma which were not suspected preoperatively or intraoperatively).<sup>12</sup> In our series, of the three specimens with specific pathology this was unsuspected in two specimens with sarcoidosis (both from the same patient). Overall, only seven out of 1294 specimens (0.5%) in these seven series showed specific pathology, which was definitely unsuspected, and in only one of these was this malignant (a lymphoma).

In view of this we believe that biopsy of the lacrimal sac wall at DCR is not indicated routinely and is only indicated if there is a reason to suspect specific pathology preoperatively or intraoperatively. To minimise the risk of overlooking specific pathology it is important to inquire about symptoms or history of systemic disease preoperatively, to assess the appearance of the lacrimal sac intraoperatively, and to biopsy the lacrimal sac in those cases where specific pathology is suspected. The only specific pathology that might be overlooked in practice with such an approach is sarcoidosis. Although most patients with sarcoidosis of the lacrimal sac have a history of sarcoidosis or an abnormal appearance of the nasal mucosa or lacrimal sac,<sup>13</sup> some cases, including ours, do not.<sup>14</sup>

In conclusion, we believe that this prospective study and literature review demonstrates that routine biopsy of the lacrimal sac wall at dacryocystorhinostomy is not indicated.

#### Authors' affiliations

C Merkonidis, C Brewis, M Yung, M Nussbaumer, Department of Otolaryngology, Ipswich Hospital NHS Trust, Heath Road, Ipswich IP4 5PD, UK

Correspondence to: Matthew Yung, PhD, FRCS, DLO, Department of Otolaryngology, Ipswich Hospital NHS Trust, Heath Road, Ipswich IP4 5PD, UK; matthew.yung@ipswichhospital.nhs.uk

Accepted for publication 4 July 2005

#### REFERENCES

- Paulsen F. The human nasolacrimal ducts. *Adv Anat Embryol Cell Biol* 2003;**170**:1–106.
- Yung MW, Hardman-Lea S. Analysis of the results of surgical endoscopic dacryocystorhinostomy: effect of the level of obstruction. *Br J Ophthalmol* 2002;**86**:792–4.
- Yung MW, Hardman-Lea S. Endoscopic inferior dacryocystorhinostomy. *Clin Otolaryngol* 1998;**23**:152–7.
- Anderson NG, Wojno TH, Grossniklaus HE. Clinicopathologic findings from lacrimal sac biopsy specimens obtained during dacryocystorhinostomy. *Ophthalmol Plast Reconstr Surg* 2003;**19**:173–6.
- Linberg JV, McCormick SA. Primary acquired nasolacrimal duct obstruction. A clinicopathologic report and biopsy technique. *Ophthalmology* 1986;**93**:1055–63.
- Tucker N, Chow D, Stockl F, et al. Clinically suspected primary acquired nasolacrimal duct obstruction: clinicopathologic review of 150 patients. *Ophthalmology* 1997;**104**:1882–6.
- Smith MG, Kong AS, Yung MW, et al. Lacrimal fossa block: an audit of a minimally invasive regional anaesthetic technique for endoscopic dacryocystorhinostomy (DCR). *Clin Otolaryngol* 2001;**26**:407–10.
- Yung MW, Hardman-Lea S. Ipswich lacrimal tube: pedicle nasal septal tube for the reconstruction of lacrimal drainage passage. *J Laryngol Otol* 2003;**117**:130–1.
- Bernardini FP, Moin M, Kersten RC, et al. Routine histopathologic evaluation of the lacrimal sac during dacryocystorhinostomy: how useful is it? *Ophthalmology* 2002;**109**:1214–17.
- Lee-Wing MW, Ashenurst ME. Clinicopathologic analysis of 166 patients with primary acquired nasolacrimal duct obstruction. *Ophthalmology* 2001;**108**:2038–40.
- Mauriello JA Jr, Palydowycz S, DeLuca J. Clinicopathologic study of lacrimal sac and nasal mucosa in 44 patients with complete acquired nasolacrimal duct obstruction. *Ophthalmol Plast Reconstr Surg* 1992;**8**:13–21.
- Hurwitz JJ. Re: "Clinicopathologic findings from lacrimal sac biopsies obtained during dacryocystorhinostomy." *Ophthalmol Plast Reconstr Surg* 2003;**19**:412; author reply 412–13.
- Chapman KL, Bartley GB, Garrity JA, et al. Lacrimal bypass surgery in patients with sarcoidosis. *Am J Ophthalmol* 1999;**27**:443–6.
- Kay DJ, Saffra N, Har-el G. Isolated sarcoidosis of the lacrimal sac without systemic manifestations. *Am J Ophthalmol* 2002;**23**:53–5.