

Preoperative imaging should be performed prior to surgery in all cases of acquired nasolacrimal obstruction—Yes

Eye (2017) 31, 351–352; doi:10.1038/eye.2016.237; published online 4 November 2016

Patients with epiphora or dacryocystitis are often found to have nasolacrimal obstruction. The recognized treatment is dacryocystorhinostomy (DCR), which is effectively performed via either an external or endonasal approach. The preoperative planning for DCR has traditionally been unique compared with other invasive operations for not routinely requiring preoperative imaging. However, there are many compelling reasons why imaging should be obtained prior to undertaking this surgery.

Computed tomography (CT) is the imaging modality of choice for most patients with nasolacrimal obstruction. Besides adequately demonstrating soft tissue anatomy, evaluation of the bony anatomy surrounding the lacrimal outflow system is best accomplished with this technique.¹ It is possible that small tumours intrinsic to the lacrimal sac may not be evident on CT imaging; however, subtle changes such as bony erosion surrounding the nasolacrimal duct may be suggestive of the pathology.²

When endoscopic DCR is planned, preoperative CT is required if use of a stereotactic image-guided system is anticipated. This three-dimensional navigation system provides intra-operative localization of anatomic structures using magnetic probes and will likely become the norm in the future for both clinical and medico-legal reasons as it can help prevent inadvertent entry into the orbit. It may also help to prevent complications secondary to anatomical variants, such as cerebrospinal fluid leak due to inadvertent intra-operative fracture of an anomalously located cribriform plate.³ In addition, knowledge of such anatomic

anomalies may be useful in preventing complications in cases where external DCR is performed.

Other CT findings such as septal deviation, turbinate malposition, and sinusitis are important to diagnose preoperatively since these conditions are sometimes contributing factors to nasolacrimal obstruction,⁴ and may require addressing by an ENT surgeon concurrently to the DCR. This may also help to dictate whether an external or endoscopic approach to DCR is chosen.

Another argument for preoperative imaging when endoscopic DCR is planned is that, there is limited visualization of the lumen of the lacrimal sac in endoscopic DCR compared with external DCR. Hence, occult malignancies or other mucosal abnormalities may go unnoticed in endoscopic procedures. Preoperative imaging can alert the surgeon to this possibility and encourage intra-operative lacrimal sac biopsy and change of surgical approach to the external route.

One of the most compelling arguments for preoperative imaging in DCR is to avoid missing the diagnosis of a malignancy or other serious pathology. A variety of benign and malignant neoplasms as well as inflammatory conditions have been described in the lacrimal outflow system, nose, and paranasal sinuses. In a retrospective clinic-pathological review, Stefanyzyn *et al*⁵ found that the most common primary malignant neoplasm of the lacrimal sac was squamous cell carcinoma. Common primary benign neoplasms included squamous and transitional cell papilloma, fibrous histiocytoma, and haemangiopericytoma. Secondary lacrimal sac neoplasms included lymphoma and malignant melanoma, as well as histiocytic disorders. Inflammatory conditions

may also occur in the lacrimal outflow system, including sarcoidosis, granulomatosis with polyangiitis, and IgG4-related disease, which might resolve with alternative therapies and obviate the need for surgery.

Primary pathology of adjacent structures such as the paranasal sinuses—including mucocoeles and a variety of carcinomas—may also result in secondary nasolacrimal obstruction. Proper identification and treatment of these conditions may not only resolve the nasolacrimal obstruction but may be lifesaving. Inadvertent surgical dissemination of tumour cells from an occult neoplasm will increase the risk of local or distant spread of disease.

The incidence of significant pathology in a series of 377 routine lacrimal sac biopsies during DCR has been reported at 8.2%,⁶ with neoplasia identified in 4.6%. More than half of these cases were not suspected preoperatively—showing that clinical acumen alone is inadequate for detecting cancer. This prompts us to advocate preoperative imaging and intraoperative biopsy for all patients.⁶

Unnecessary radiation is frequently raised as an argument against CT imaging. However, Wang *et al*⁷ have shown that parameter adjustment can limit exposure to an effective dose of 0.26 mSv without loss of significant loss of quality; for context, health effects of radiation doses under 100 mSv are so low as to be undetectable by epidemiological methods; natural background radiation is around 3 mSv per year.⁸

Hence, a variety of factors including the risk of missing or aiding the spread of significant occult pathology, as well as concern about complications due to unrecognized anomalous anatomy of the lacrimal duct adnexae should prompt the lacrimal surgeon to consider preoperative imaging in all patients anticipating DCR surgery.

Conflict of interest

The authors declare no conflict of interest.

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