OUTCOMES OF DACRYOCYSTORHINOSTOMY IN PATIENTS WITH HEAD AND NECK TUMORS

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Abstract: Background. The purpose of this study was to evaluate the outcomes of dacryocystorhinostomy (DCR) in patients with head and neck tumors.

Methods. The clinical records of all 31 patients with head and neck tumors who underwent DCR for nasolacrimal duct blockage at The University of Texas M. D. Anderson Cancer Center between 1999 and 2003 were retrospectively reviewed.

Results. The tumor diagnoses were squamous cell carcinoma (n = 18), chondrosarcoma (n = 3), sinonasal carcinoma (n = 2), adenoid cystic carcinoma (n = 2), sinonasal papilloma (n = 2), esthesioneuroblastoma (n = 1); hemangiopericytoma (n = 1); ameloblastoma (n = 1), and osteosarcoma (n = 1). Twenty-eight patients had a maxillectomy or other sinus surgeries, 10 had radiotherapy, and 14 had chemotherapy and radiotherapy before DCR. All 31 patients (35 eyes) experienced improvement of epiphora after DCR, but five patients (six eyes) had recurrent nasolacrimal duct blockage develop during the study period. Two patients had mild wound infections; none had osteoradionecrosis.

Conclusions. DCR alleviates nasolacrimal duct blockage in most patients with head and neck tumors and is not associated with unusual complications in this setting. © 2004 Wiley Periodicals, Inc. Head Neck 27: 72–75, 2005

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Tumors involving the nasal cavity or paranasal sinuses are often treated with a combination of ablative surgery, radiotherapy, and chemotherapy to improve survival.¹,² Sinus surgery including maxillectomy is commonly performed for malignant tumors, such as squamous cell carcinomas (SCCAs) and adenoid cystic carcinomas, as well as for some locally aggressive benign tumors, such as inverted papillomas. Although we are aware of no published prospective trials that report the frequency of nasolacrimal duct blockage as a side effect of therapy for head and neck cancer, maxillectomy or other paranasal sinus surgery, radiotherapy, and certain forms of chemotherapy are known to cause nasolacrimal duct damage and eventual blockage in some patients.³–¹⁰

Dacryocystorhinostomy (DCR) is considered the treatment of choice for anatomic blockage of the nasolacrimal duct but is generally viewed as less successful or more risky in patients with head and neck cancer than in those with primary idiopathic nasolacrimal duct blockage.⁵ The goal of the study reported here was to evaluate the outcomes of DCR at a single center in patients with head and neck tumors who had nasolacrimal duct blockage develop after ablative surgery, radiotherapy, chemotherapy, or a combination of these modalities.
PATIENTS AND METHODS

Appropriate institutional review board approval was obtained for this retrospective review. The clinical records of all 31 patients with a primary head and neck cancer or locally aggressive benign tumor of the head and neck who had undergone a DCR performed by one of us (BE) between March 1999 and March 2003 were reviewed. For each patient, the primary tumor diagnosis, the type of ablative surgery, concomitant radiotherapy or chemotherapy, preoperative and postoperative findings during in-office probing and irrigation, type and outcome of DCR, and complications of DCR were reviewed. All patients underwent an external DCR with the placement of a silicone tube or a Pyrex glass tube, depending on the severity of canalicular blockage. Mitomycin C was not used at the time of DCR in any of the patients. The intervals between the completion of radiotherapy and chemotherapy and DCR and the follow-up time, measured from DCR to the date the patient was last seen in the ophthalmology clinic, were recorded in each case.

RESULTS

Nasolacrimal duct blockage was diagnosed through in-office probing and irrigation in 35 eyes of 31 patients. All patients had a presenting complaint of epiphora and chronic eye discharge. The patients ranged in age from 32 to 83 years (median, 63 years). There were 20 men and 11 women.

The tumor diagnoses were SCCA in 18 patients (16 with paranasal-sinus SCCA and two with skin SCCA), chondrosarcoma in three patients, sinonasal carcinoma in two patients, adenoid cystic carcinoma in two patients, sinonasal papilloma in two patients, esthesioneuroblastoma in one patient, hemangiopericytoma in one patient, ameloblastoma in one patient, and osteosarcoma in one patient.

Twenty-eight patients had previously undergone paranasal sinus surgery; 21 had undergone maxillectomy, and seven had undergone ethmoidectomy and sphenoidectomy. Six patients had silicone intubation of the nasolacrimal duct during maxillectomy but later had epiphora and nasolacrimal duct blockage develop despite this maneuver and thus were included in this study. In all six patients, there was moderate (erosion of up to 6 mm of the length of the canaliculus) to severe canalicular erosion (erosion of the entire distal portion of the canaliculus) because of the silicone stents placed at the time of maxillectomy.

Twenty-two patients received radiotherapy to the head and neck region before DCR. Three additional patients had radiotherapy after DCR because of local recurrence of head and neck cancer. The total radiation dose ranged from 43 to 70 Gy (mean, 61.0 Gy), and the number of fractions ranged from 19 to 41 (mean, 29.5). The interval between completion of radiotherapy and DCR ranged from 2 to 120 months (median, 31.5 months). Twelve patients had combined chemotherapy and radiation before DCR. The chemotherapeutic agents included etoposide, cisplatin, ifosfamide, paclitaxel, interferon, fluorouracil, cytarabine, and methotrexate. The interval between completion of chemotherapy and DCR ranged from 2 to 96 months (median, 12.5 months).

Nasolacrimal duct blockage was unilateral in 27 patients and bilateral in four patients. Ten patients had chronic dacryocystitis as an obvious clinical finding before DCR; all 10 were successfully treated with DCR and did not experience recurrent dacryocystitis during the study period.

Twenty-eight patients (30 eyes) had silicone tubes placed at the time of DCR; three patients (five eyes) had severe canalicular stenosis and thus required placement of a Pyrex glass tube at the time of DCR (a conjunctivo-DCR to allow for placement of a Pyrex glass tube). The follow-up time after DCR ranged from 6 to 65 months (median, 11 months; mean, 16.3 months).

All 31 patients (35 eyes) experienced improvement of epiphora after DCR, but in five patients (six eyes), epiphora recurred during the study period. Probing and irrigation in these five patients revealed recurrent nasolacrimal duct blockage. In the 28 patients (30 eyes) who underwent DCR and silicone intubation, four eyes (four patients) had closure of their lacrimal bypass after removal of the silicone tubes, suggesting a failure rate of 13% in this group. One patient had tumor recurrence in the nasal cavity as the cause of recurrent nasolacrimal duct blockage; he subsequently underwent a total rhinectomy. The other three patients with recurrent nasolacrimal duct blockage elected not to have additional surgery. In these three patients, the intervals between completion of radiotherapy and DCR were 8 months, 11 months, and 14 months. Of the three patients (five eyes) who had conjunctivo-DCR and Pyrex glass tube placement, one patient (two eyes) had recurrent blockage because of extrusion of the Pyrex glass tubes, which were later replaced.

None of the 22 patients who had had radiotherapy before DCR had osteoradionecrosis de-
velop. Two patients (both of whom had had radiotherapy before DCR) had mild wound infections develop; these infections resolved after 1 week of systemic oral antibiotic therapy.

**DISCUSSION**

Nasolacrimal duct blockage is a well-recognized side effect of therapy in patients who have nasal or paranasal sinus tumors. Our study suggests that DCR can alleviate epiphora and its anatomic correlate, nasolacrimal duct blockage, in most patients with head and neck tumors with this side effect.

The etiology of nasolacrimal duct obstruction in patients with head and neck cancer is probably multifactorial. Medial maxillectomy is a known cause of nasolacrimal duct obstruction. Radiotherapy is a known cause of canalicular and nasolacrimal duct inflammation and eventual fibrosis, although the exact incidence of this side effect is not well established. Several chemotherapeutic agents have been associated with canalicular and nasolacrimal duct blockage. Epiphora is a known side effect of fluorouracil, and docetaxel; these chemotherapeutic agents can be associated with irreversible canalicular and nasolacrimal duct blockage that warrants lacrimal bypass surgery.

It has been suggested that primary silicone intubation performed during maxillectomy can prevent nasolacrimal duct blockage. Six patients in our cohort had had silicone intubation at the time of maxillectomy but still had nasolacrimal duct blockage develop requiring a secondary DCR. Thus, it seems that at least in some patients, primary silicone intubation does not prevent nasolacrimal duct blockage and can lead to canalicular erosion. Postoperative cicatricial changes, radiotherapy, and chemotherapy may contribute to scarring and blockage around the silicone tubes and canalicular erosion in this situation. If the distal portion of the canalculus is eroded beyond a few millimeters, the opportunity to insert a silicone tube at the time of a future DCR is lost, and one may have to resort to a conjunctivo-DCR and placement of a Pyrex glass tube as the only way to alleviate epiphora. The classic teaching is that any type of lacrimal bypass surgery should be performed when there is minimal inflammation and after all local therapies are completed; this dictum seems to also hold for patients discussed in this article.

The overall DCR failure rate in our cohort (17%) was higher than the reported failure rate of 2% to 5% for DCR in patients with primary idiopathic nasolacrimal duct blockage. It may be helpful to separate the outcomes in patients who had a conjunctivo-DCR from those who had a DCR with silicone tube placement in our cohort. One patient (two eyes) of three (five eyes) who underwent a conjunctivo-DCR had extrusion of the Pyrex glass tube and required replacement, although the lacrimal bypass passage had remained open. Extrusion of the Pyrex glass tube is an expected shortcoming of conjunctivo-DCR and is expected to occur in up to 50% of patients according to most authorities. Of the 30 eyes (28 patients) that had DCR with silicone intubation, four eyes (four patients) had closure of their lacrimal bypass after removal of the silicone tubes, suggesting a failure rate of 13% in this group. Tumor recurrence was the cause of DCR failure in one patient, underscoring the importance of considering cancer recurrence as a cause of nasolacrimal duct blockage in all patients with head and neck cancer. In the other three patients in whom DCR failed, no specific high-risk features for failure were identified, except that all three patients had had external beam radiotherapy 8 months, 11 months, and 14 months before DCR. It is possible that in these three patients, ongoing acute effects of radiotherapy in the nasal mucosa contributed to the closure of the surgically created lacrimal passage and thus failure of DCR.

Some practitioners express concerns about an increased risk of osteoradionecrosis in patients who have had radiotherapy and are exposed to lacrimal bypass surgery. Most patients in our series had undergone radiotherapy before DCR. None had osteoradionecrosis develop. None of the patients in our series had had external beam radiotherapy 8 months, 11 months, and 14 months before DCR. We were unable to find any reported cases of osteoradionecrosis specifically associated with or exacerbated by DCR. However, osteoradionecrosis is a well-known complication of radiotherapy for head and neck tumors, most commonly reported in the body of the mandible and the jaw and occurring in up to 8% of patients with head and neck cancer who undergo high-dose radiotherapy. Factors associated with a higher incidence of osteoradionecrosis include advanced tumors, segmental resections of the mandible, and preradiotherapy or postradiotherapy tooth extractions.

The surgical complication rate in our series was quite low. Mild local soft-tissue wound infec-
tions were seen in only two patients, and the infections resolved with a short course of systemic oral antibiotics.

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**REFERENCES**