Case Report

Naso-cutaneous fistula following transcanalicular laser dacrocystorhinostomy

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Abstract

We report a case of naso-cutaneous fistula due to thermal injury during transcanalicular laser dacrocystorhinostomy followed by superadded infection with coagulase negative staphylococcus in a diabetic patient. The case highlights the importance of meticulous wound care in the management and possibility of its occurrence even with minor thermal injury in immunocompromised patients.

Keywords: Fistula, Laser, Naso-cutaneous, Immunocompromised, Diode

Introduction

Endonasal procedures to correct nasolacrimal duct obstruction have been reported by several authors beginning over 100 years ago. However limited visualization of surgical site hindering effective soft tissue and bone removal stalled its widespread acceptance. Introduction of rigid fiberoptic endoscope has lead to resurgence of interest in this procedure in the last decade.

Transcanalicular laser dacrocystorhinostomy (TCL-DCR) is a minimally invasive technique performed under endoscopic guidance. The technical difficulty in this approach is delivery of sufficiently powerful laser beam via a relatively narrow optical fiber which in turn fits into an endocanaliculuar probe. Though 980 nm diode laser seems to adequately fulfill the above requirement, it has a potential for unwanted collateral heating and residual thermal damage to target tissue. Thermal injury to adjacent tissues is very rare and was reported in only one of 118 patients in the study by Hong et al. We report a case of naso-cutaneous fistula following thermal injury during TCL-DCR in a diabetic patient.

Case report

A 60 year old lady presented to oculoplastic clinic with chief complaints of watering and mucoid discharge from the right eye for the past 6 months. There was no history of redness, pain, trauma or any other previous surgery. The patient was a known diabetic, controlled on treatment for the past 5 years. She did not have hypertension or any other medical problem. On ophthalmological examination, a small diffuse soft swelling was noted at right lacrimal sac area which on compressing was associated with regurgitation of mucoid discharge from both upper and lower punctum of the right eye. Syringing and probing of lacrimal passage revealed obstruction of nasolacrimal duct on right side. Lacrimal passage of left side was patent on syringing. The best corrected visual acuity was 20/20 and anterior as well as posterior segments were normal in both the eyes. General physical and systemic examination of the patient was unremarkable. On the basis of history and examination, diagnosis of right chronic dacryocystitis was made and patient was worked up for right TCL-DCR. Blood coagulation studies,

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blood chemistry analysis, urine analysis and rhinological examination revealed no abnormality. The 980 nm Diode laser machine (Appasamy Super Diode) with 0.4 mm laser delivery, silicon coated cable and 0° rigid nasal endoscope mounted with camera was used for TCL-DCR. Topical and infratrochlear infiltration anesthesia with 2% xylocaine and nasal packing was done. Lower canalicular system was gradually dilated, the sac expressed out and the laser probe with sleeve was introduced up to a hard stop. The probe was then directed slightly at an inferior angle. The aiming beam at the probe end was visualized endoscopically at the lateral wall of nose through bone and mucosa. After positioning in the antero-inferior part of the middle meatus, laser delivery was started with power setting at 7 watts continuous mode. Lacrimal sac mucosa, bone and nasal mucosa were vaporized to create a fistula of around 8 mm diameter. At the termination of the surgery lower canalicular burn with surrounding soft tissue erythema and edema was noted. Syringing was patent from the upper punctum. The patient was discharged on oral ciprofloxacin 500 mg twice a day, tablet ibuprofen 400 mg thrice a day and ciprofloxacin eye drops four times a day. She remained asymptomatic for 3 days and on the 4th day post operatively the patient presented with redness, tenderness, discharge at the area of canalicular burn with a large tissue defect and surrounding tissue necrosis. Grams staining of discharge demonstrated gram positive cocci and culture revealed coagulase negative staphylococcus sensitive to 3rd generation cephalosporin. Patient was started on intravenous ceftriaxone 1gram twice daily for 10 days, local dressing with povidone iodine and paraffin gauze. Paraffin gauze and povidone iodine dressing was done daily for initial 1 month and then twice a week for the next 1 month. The blood sugar was monitored in conjunction with medical specialist. This conservative management led to granulation tissue formation and closure of naso-cutaneous fistula. (Figs. 1 and 2).

Discussion

Lasers in endonasal surgery, involve instant vaporization/ablation of tissue and a delayed tissue loss by coagulation effect. The response of tissues to laser energy is influenced by the laser wavelength application method (continuous versus pulsed), power and energy density and tissue properties. Diode laser induces large coagulation zones. These coagulation zones are present beneath the ablation crater which destroyed and sealed blood vessels. Delayed epithelialization and prolonged inflammation occur in laser treated tissues.

The principle of the Diode laser is through absorption of its energy by the target tissue and transformation of this energy into heat (thermal effect) that is capable of making an incision in mucosa and bone, thus creating a fistula between the lacrimal sac and the nasal cavity. In our patient, the thermal effect produced by laser leads to inflammation of adjacent tissues. The coagulation effect was followed by a secondary infection by coagulase negative staphylococci and subsequent breakdown of tissues and formation of naso-cutaneous fistula.

Coagulase negative staphylococci are a part of normal flora and cause clinically significant infections in immunocompromised patients. Tissue necrosis and naso-cutaneous fistula have been reported after TCL-DCR following aspergilous infection.

Various authors have emphasized the use of saline and viscoelastic material to dissipate heat and protect the canaliculi and common canaliculus during treatment. There are no definitive guidelines for preventing collateral damage so far. Also there is deficient literature on the maximum safe amount of laser energy to be used.

To conclude, TCL-DCR should be performed cautiously using only minimal laser energy especially in immunocompromised patients. The laser should be fired only when the tip of the probe is in contact with the bone. The treatment protocol of naso-cutaneous fistula involves administration of appropriate antibiotics and meticulous wound care.

Conflict of interest

The authors declared that there is no conflict of interest.

References


