

Validation of MDCT in Post Traumatic Nasolacrimal Obstruction –A Case Report.

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ABSTRACT

Introduction: Injuries to lacrimal apparatus in blunt trauma to face can present as epiphora consequent upon acute or chronic obstruction of nasolacrimal pathway. Preoperative assessment of level, cause of obstruction is imperative in planning treatment. **Case Report:** 26 year male presented with epiphora, discharging sinus lateral to nasal ala following surgical repair of facial trauma. Multi detector computed tomography (MDCT) revealed injury to intraosseous part of nasolacrimal duct with mucocele formation of lacrimal sac. **Conclusion:** MDCT is useful in assessment of level of injury / obstruction in nasolacrimal apparatus post trauma.

Keywords: MDCT, Nasolacrimal Obstruction, Trauma.

INTRODUCTION

Blunt trauma to face with complex fractures is common with road traffic accidents. Injuries to lacrimal apparatus can involve lacrimal canaliculi, lacrimal sac or nasolacrimal duct. Consequent symptoms like epiphora can be transient due to acute soft tissue edema, ecchymosis. Persistent or recurrent symptoms shall warrant search for obstructive injury in the nasolacrimal duct (NLD).^[1-4]

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CASE REPORT

A 26 year old male patient suffered multiple facial injuries in a road traffic accident. Following surgical repair he presented in ophthalmology clinic with a sinus discharging clear, watery fluid (tears) on the left side just lateral to left nasal ala approximately at the level of mid of the nose. He was referred to the radiology department for CT examination of face, orbits. MDCT images were acquired on Philips Ingenuity Core 128 slice scanner (Philips, Netherlands) using following parameters: KV 120, mAS 251, FOV 220.0mm, Matrix 512, Row images Slice thickness – 1.0mm, Slice gap 0.5mm, MPR Slice thickness – 1.0mm, Slice gap 0.49mm. The images were evaluated in soft tissue & bone

window. CT revealed enlarged left lacrimal sac with hyperdense fluid contents suggestive of mucocele formation. Comminution of lateral wall of left nasolacrimal fossa was seen with discontinuity of left nasolacrimal duct at the level of the inferior orbital rim caused by displaced bony fragments. Multiple others fractures were seen in facial bones, including fracture frontal bone on the left side extending to the superior rim of left orbit & left frontal sinus with left frontal hemosinus, fracture posterior-lateral & medial walls of the right orbit, fracture bilateral nasal bones, fracture inferior rim of left orbit. Fracture body of the maxilla was also seen on left side involving alveolar margins with internal fixator in situ. Fixator was also seen right side of maxilla in the region of zygomatico-maxillary suture.

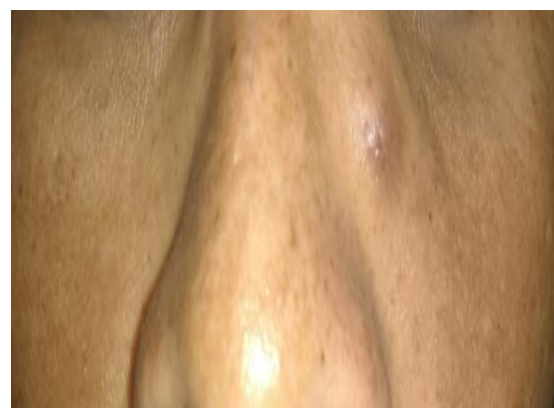


Figure 1: Photographic image of the patient showing sinus lateral to left nasal ala.

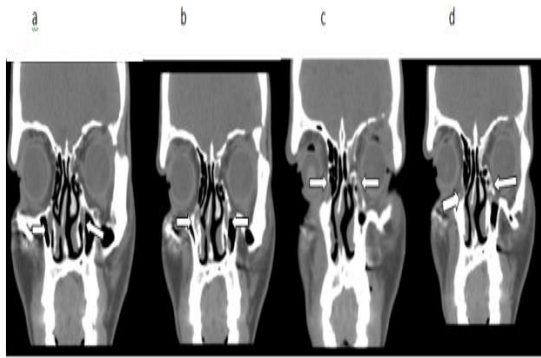


Figure 2: Serial coronal CT images showing normal bilateral nasolacrimal ducts in a and b (white arrows), lacerated left nasolacrimal duct with displaced fractured bony fragments and normal right nasolacrimal duct in c and d (white arrows).

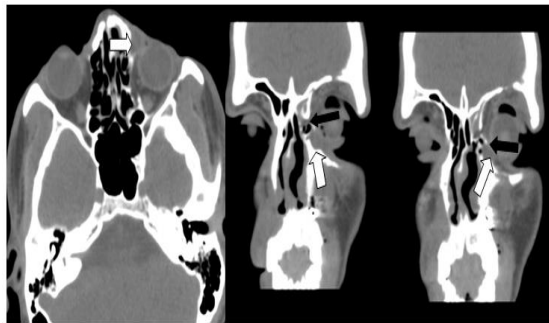


Figure 3: Axial a and coronal b, c images showing lacrimal sac mucocele (white arrow) and lacerated left NLD by displaced fractured fragments (black arrows).

DISCUSSION

Tears are produced by group of glands in the lacrimal system, including lacrimal gland proper, the accessory glands of Krause and Wolfring, the glands of Zeis, and the Meibomian glands. Thereafter they collect in the lacrimal lake at inner canthus and thence follow a course through the lacrimal drainage apparatus (lacrimal canaliculi, lacrimal sac, and nasolacrimal duct) to the inferior nasal meatus. The lacrimal sac is situated in the lacrimal fossa, a depression in the inferomedial orbital wall located between the anterior lacrimal crest (ALC) of the frontal process of the maxilla and the posterior lacrimal crest (PLC), a linear ridge of the lacrimal bone. The NLD is partly separated from the sac by valve like folds of mucosa (valves of Krause). It has two parts: The intraosseous part lies within the bony NLC, a groove in the maxilla between the lateral aspect of the nose and medial aspect of the orbit. The membranous or meatal part is 5.0mm long & runs beneath the nasal mucosa.

Modern multidetector CT (MDCT) being fast, cost effective, and sensitive is invariably the first means of assessing bone and soft tissue injuries in facial trauma patients. Radiographic examination is

inadequate due to positioning difficulties and limited provided information about the extent of bony and soft tissue injuries. Magnetic Resonance Imaging (MRI) though provides multiplanar information is a lengthy exam with limited accessibility and availability. MRI as well offers lower spatial resolution than CT. Evaluation of bony injuries is inferior with MRI in comparison to CT. MRI examination might not also be feasible owing to possibility of metallic artifacts.

Superior spatial resolution of MDCT empowers excellent multiplanar reformations, and 3-D reconstructions, improving diagnostic accuracy and surgical planning by facilitating the assessment of fracture patterns, displacement. Studies have established the role of MDCT in the evaluation of lacrimal apparatus in conditions ranging from trauma to inflammatory and tumors.^[1,2]

Lacrimal canalicular lacerations can be seen with eyelid injuries. Lacrimal sac is relatively well protected by the nasal pyramid and the ALC^[5]. Weak bony walls render the osseous part of the NLD most vulnerable^[6,7].

Fractures of weak bony walls of intraosseous part of nasolacrimal duct render high risk, of lacerations however with low incidence^[8].

Powell^[9] found obstructive nasolacrimal symptoms in 40 % of patients with medial orbital fractures. Unger^[10] identified 36 fractures on CT evaluation of 25 patients of facial trauma with complications arising out of lacrimal apparatus obstruction in five of these patients.

So far, fluorescein dye test^[11] is usually sufficient to diagnose lacrimal apparatus obstruction in post trauma patients. CT however, can detect fracture fragments that can cause lacerations, scarring to nasolacrimal duct in closed manipulation. CT hence can differentiate cases requiring closed manipulation from the ones in which open surgical therapy would be more appropriate.

The location of fracture fragments on MDCT can suggest the location of the point of obstruction when is obtained for preoperative planning.

Eldesoky et al^[2] evaluated useful role of CT dacryocystography in evaluation of nasolacrimal duct obstruction. This however involves the cumbersome process of instillation of contrast into conjunctival cul de sac or lacrimal canaliculi.

CONCLUSION

MDCT is useful in assessment of post injury nasolacrimal obstruction in patients of facial trauma without any topical or intracanalicular contrast . it can accurately depict level of injury/obstruction .Accurate delineation of displaced fractured bony fragments from bony nasolacrimal fossa can help differentiate patients requiring closed reduction or open surgical intervention.

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