Imaging of the Postoperative Orbit

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KEYWORDS

• Imaging • Orbit • Postoperative • Prosthesis • Reconstruction • Retinopexy

KEY POINTS

- Inappropriate neuroimaging preceding ophthalmology referral can lead to inappropriate use of costly resources, with a potential for overdiagnosis and false positives.
- Imaging plays a critical role in recognizing the normal postoperative appearance of the commonly encountered orbital procedures, and enables early diagnosis of complications.
- The common eye surgeries that are evident on imaging include: (1) cataract surgery and intraocular lens implant; (2) retinal detachment surgeries (retinopexy, scleral buckling, and vitrectomy); (3) glaucoma aqueous shunting; (4) evisceration and enucleation; (5) ocular prosthesis; (6) eyelid weights; (7) dacryocystorhinostomy; (8) orbital decompression; (9) maxillofacial orbital reconstruction; and (10) orbital exenteration and reconstruction.
- Silicone oil, silicone sponge and rubber band, prosthesis, and implant should not be mistaken for unintended foreign bodies. Postoperative infection should be promptly identified to avoid the devastating consequence of permanent loss of vision.
- Oncologic orbital reconstruction uses vascularized free flaps composed of skin, subcutaneous fat, or fascia, with or without muscle, and at computed tomography and MR imaging their appearance reflects the flap compositions. The expected swelling and enhancement of a normal flap as a result of denervation or adjuvant chemoradiation should not be mistaken for neoplasm. Neoplasm tends to recur at the interface of the free flap and recipient surgical bed, and demonstrates mass-like growth with an appearance similar to that of the original tumor.

INTRODUCTION

The Centers for Disease Control and Prevention report the leading causes of blindness and low vision in the United States as age-related eye diseases such as macular degeneration, cataract, diabetic retinopathy, and glaucoma.[1] Cataract is the leading cause of blindness and can occur at any age. An estimated 20.5 million (17.2%) Americans aged 40 years and older have cataract, and 6.1 million require intraocular lens (IOL) replacement. Diabetic retinopathy is the leading cause of blindness in American working-aged adults (20–74 years of age) with an estimated 4.1 million Americans affected by the disease. Vitrectomy plays a vital role in the management of severe complications of diabetic retinopathy. Glaucoma is the second leading cause of blindness worldwide in Caucasians, and the leading cause of blindness in Africans and Latinos.[2] In all ethnic groups, the prevalence of glaucoma increases dramatically with age, and the aging

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population in the United States is expected to increase by an additional 67% by 2050. As a result, the number of persons with glaucoma is expected to increase an additional 50% from 2000 to 2020, leading to increasing utilization of aqueous shunting procedures.[2–4] The number of patients with postoperative orbital procedures encountered on head and neck imaging will also be increased because of the increasing epidemic of diabetes and our rapidly aging population.

Table 1
Common types of ophthalmologic surgeries for common diseases

Pathology	Surgery	Therapeutic Goals	Highlights of Surgical Technique
Cataract	Intraocular lens implant (IOL)	To replace the damaged lens to restore vision	IOL replaces the surgically removed cataractous lens
Glaucoma	Glaucoma shunt implant	To reduce intraocular pressure by decompression of aqueous humor	Glaucoma shunt is implanted most commonly in the superior temporal quadrant of the globe
Retinal detachment	Retinopexy Scleral buckling Vitrectomy	To reappose rhegmatogenous and or tractional retinal detachment	Scleral buckle is placed radially, segmentally, or circumferentially around the globes Intraocular injected air or silicone oil fills the vitrectomy cavity
Unsalvageable globe from trauma or infection or ocular tumor	Evisceration, enucleation and ocular implant	To eradicate the disease and provide cosmesis	Removal of the globe without (evisceration) or with (enucleation) removal of the sclera. Ocular implant is placed into the empty socket
Eyelid paralysis	Eyelid weight implant	To close the upper eyelid	Subcutaneous gold implant is secured to the tarsus in upper eyelid
Lacrimal obstruction	Dacryocystorhinostomy	To relieve lacrimal obstruction	Stent drains the lacrimal fossa to the inferior meatus
Thyroid-associated orbitopathy	Orbital decompression	To decompress the orbit for cosmesis and compressive optic neuropathy	Surgery removes the medial, inferior, or lateral orbital walls
Fracture	Orbital wall reconstruction	To restore orbital volume, cosmesis, and function	Autologous bone or cartilage, silicone, titanium plate and mesh, porous polyethylene material are used to reconstruct the orbital walls
Orbit malignancy	Orbital exenteration and reconstruction	To resect tumor and close orbital exenteration defect and restore cosmesis	Free flap is contoured to fill the exenteration defect and its vascular pedicle is reanastomosed to the available regional vessels