

Delayed Orbital Haemorrhage with Possible Infectious Aetiology after Silicone Implantation

Dear Editor,

The principles of exploration and repair of orbital floor fractures are to restore the anatomical structure of the orbital wall to its original state (as much as possible), functional capabilities of the extraocular muscles and useful binocular single vision. Various materials have been used in the repair of such fractures, including autogenous (cartilage, bone) and alloplastic (e.g. Teflon®, Supramid®, silicone, titanium) implants. Delayed orbital haemorrhage following the use of alloplastic implants is an uncommon complication. Only 22 of such cases have been found in published medical literature between 1984 and 2005. This complication can surface anytime between 3 months and 20 years following implantation. However, none have reported infective components associated with delayed orbital haemorrhages. In the following report, we present 1 such case seen at the Singapore National Eye Centre, with isolation of coagulase-negative *Staphylococcus* from cultures taken intraoperatively.

Clinical Picture

The case discussed involves a 49-year-old Chinese female with a known history of right orbital floor fracture following an accident that occurred 12 years prior to presentation. The fracture site was repaired using a silicone implant at a private hospital with uneventful recovery. She remained asymptomatic until she presented to us with a 2-week history of right lower eyelid swelling, discomfort and double vision on up gaze. These symptoms were gradual in onset and were usually worse in the mornings. She denied any recent trauma, nasopharyngeal symptoms or headaches.

Clinical examination revealed mild right periorbital swelling and bluish brown discolouration of the lower lid skin with no tenderness. There was limitation of up and down gaze on the same side. Hertel exophthalmometry measured 20 mm in both eyes, with the right globe displaced superiorly by 1 mm. Hess chart and Binocular Single Vision testing demonstrated diplopia on extremes of gaze.

The patient was treated for possible orbital infection and was prescribed a 1-week course of oral ciprofloxacin, serrapeptase, topical tobramycin and dexamethasone by the ophthalmologist. There were no improvements in her symptoms. Subsequent computed tomography (CT) of the orbits with contrast enhancement was performed which revealed a right infra-orbital hyper-intense dome-shaped lesion measuring 2.3 x 0.6 cm in the subperiosteal space,

elevating the globe (Fig. 1). A right orbital floor implant was seen above the orbital floor (which appeared intact) and below the lesion.

Clinical findings and imaging studies were suggestive of the presence of a fluid collection in the right inferior subperiosteal space, which warranted surgical exploration and drainage.

Treatment

An exploration and drainage was performed using a trans-conjunctival approach under general anaesthesia. On incision of the periosteum along the inferior orbital rim, a small amount of chocolate-coloured fluid was released. The remaining 1 mL was aspirated and sent for histological examination and bacteriology studies (Fig. 2). Upon reflection of the orbital periosteum, a large silicone implant was seen anchored to the orbital rim with sutures. On release of these sutures, the implant was seen encapsulated within a fibrous capsule. The implant was freed from the capsule and adjacent tissues, and subsequently removed from the orbit. Some yellowish, powdery deposits were seen on the surface of the silicone implant. The previous fracture site appeared well covered with fibrous tissue, providing adequate support for the orbital contents.

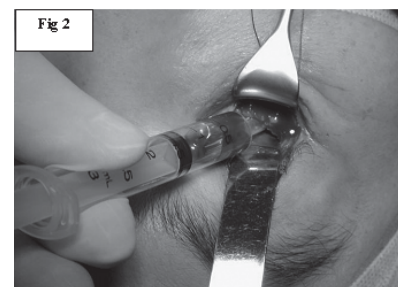
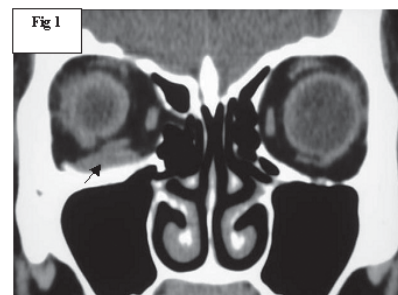


Fig. 1. Coronal CT – hyper-intense lesion in the subperiosteal space, elevating and indenting the right globe (black arrow).

Fig. 2. Subperiosteal chocolate-coloured aspirate.

Outcome

Cytopathological analysis of the aspirate revealed blood, scattered inflammatory cells and a few aggregates of foamy histiocytic cells. Cultures of the aspirate grew coagulase-negative *Staphylococcus* sensitive to ciprofloxacin, while cultures from the silicone implant were negative for micro-organisms. The patient completed a 14-day course of oral ciprofloxacin and made an uneventful recovery. Resolution of the lid swelling, proptosis and globe displacement occurred 2 weeks post-surgery. Hess chart showed minimal limitation of right depression while binocular single vision charting revealed diplopia mainly on extreme elevation.

Discussion

A review of the literature between 1984 and 2005 revealed 22 cases of delayed orbital haemorrhage seen with the use of orbital implants. All of the implants used, if identified, were alloplastic in nature (Teflon®, Supramid®, silicone, silastic).¹⁻⁶ The duration between surgical introduction of the orbital implants and clinical presentation ranged from just over 2 years to 20 years. Of the 22 cases identified, 1 case had a history of preceding trauma while another case was preceded by a bout of coughing and sneezing.^{1,7} The remaining cases had no identifiable predisposing factors.

Table 1 summarises these reports. CT and magnetic resonance imaging (MRI) were used in the diagnosis of orbital cysts and haematomas. Surgical interventions with removal of the implants were required in all but 2 of these patients.^{2,9} However, the reasons for adopting conservative treatments were indeterminate.

The underlying patho-physiological mechanism, though not well explained, is possibly related to the development of abnormal vessels within the scar tissues around the previous fracture site. Spontaneous or traumatic bleeding that occurs following trivial injury results in blood collection underneath the periosteum. Swelling and bluish discolouration of the periorbital skin are good indicators of underlying orbital haemorrhage. The co-existent bacterial aspirate could either be a result of secondary bacterial infection of the sub-periosteal blood from adjacent skin or sinus bacteria flora, or abnormal vessel formation in the scar tissues that ultimately lead to haematoma formations. Other complications with the use of alloplastic implants include infections, extrusion and ectropion.

Delayed orbital haemorrhage should always be considered as a differential diagnosis in delayed and unexplained diplopia following the use of alloplastic implants in the repair of orbital wall fractures. Early surgical intervention

Table 1. Summary of Alloplastic Orbital Implants Resulting in Delayed Haemorrhage

	No. of cases	Type of implant	Duration between implantation and presentation	Management of haemorrhage	Cyto-histology
Mauriello et al (1984) ¹	3 *	Teflon	13 y	Implant removed	Fibrous capsule, cyst-like structure
		Teflon	16 y	Implant removed	Fibrous capsule, respiratory-epithelium lined cyst
		Teflon	20 y	Implant removed	Fibrous tissue with, no cyst
Jordan et al (1992) ²	2	Teflon Supramid	2 y 2 mo 3 mo	Implant removed Conservative	Capsule with mucoid material Presumed capsule containing blood
Marks & Yeatts (1994) ³	3	Teflon	15 y	Implant removed	Scar tissue surrounding blood
		Silicone	10 y	Implant removed	Cyst containing blood
		Silicone	16 y	Implant removed	Haemorrhagic cyst
Rosen (1996) ⁴	1	Supramid	10 y	Implant removed	Serosanguinous effusion with blood
McCannel et al (1996) ⁷	1 **	Unknown	20 y	Implant removed	Haemosiderin-laden macrophages
Kang & Kwak (1996) ⁵	1	Silastic	5 y	Implant removed	Hematic cyst
DeBacker et al (1998) ⁸	1	Unknown	Unknown	Unknown	Haemorrhagic cyst
Gilhotra et al (2002) ⁹	4	Unknown	18 y	Implant removed	Cavity with sterile, dark-brown fluid
		Silicone	5 y	Implant removed	Old liquefied haematoma
		Silicone	14 y	Implant removed	Old liquefied haematoma
		Unknown	15 y	Conservative	—
Custer et al (2003) ⁶	4	Supramid	7.8 to 10 y	Implant removed	Capsule containing blood
Glavas et al (2005) ¹⁰	1	Unknown	12 y	Implant removed	Haemorrhagic cyst
Chan et al (2007)	1	Silastic	12 y	Implant removed	Fibrous capsule containing blood

* 1 case had a history of preceding trauma

** Case preceded by bout of coughing and sneezing

is required to prevent infection and relieve symptoms if the sub-periosteal bleeding is significant and fails to resolve with time.

Conclusion

Delayed orbital haemorrhage is a known, albeit uncommon, complication following orbital fracture repair surgery with the use of an alloplastic implant. The exact incidence and pathogenesis remain unknown. The underlying patho-physiology appears to stem from bleeding, possibly from the abnormal vasculatures surrounding the implant, which may occur months or even years after the initial surgery. In view of the positive bacteriological culture result in our patient, the co-existing staphylococcal infection may have played an unexplained role in the orbital haemorrhage, and may also account for other cases of delayed orbit haemorrhages associated with silicone implants. There may therefore be a place for antibiotic prophylaxis for all orbital implants and merits further research.

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