Origin of orbital blood cysts

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The origin of blood cysts as presented in the ophthalmic literature may be summarized as follows:

(1) Blood cysts without epithelial or endothelial lining most probably result from the breakdown of a haematoma (Denig, 1902; D'Amico, 1924; Awerbach, 1933; Wheeler, 1937; Svoboda, 1948). The orbital haematoma may result from trauma, blood disease or strain that increases the pressure in the jugular veins. As there are no valves in these veins, this unobstructed pressure is transmitted to the vessels of the skull and may cause an orbital haemorrhage (Reese, 1963).

(2) Some probably occur as sequelae of previously unrecognized orbital lymphangiomas (Jones, 1957).

(3) Others may occur as the result of traumatic fat necrosis which leads to the development of a cavity into which there may or may not be haemorrhage (Duke-Elder, 1952).

The following two cases are of extreme interest because they show clearly the origin of most orbital blood cysts.

Case reports

In these two cases there was no history of trauma nor did a complete medical examination reveal any abnormality. Casoni's test for hydatid cyst and the tuberculin test were negative. The basal metabolic rate and ¹³¹iodine uptake tests were normal. Postero-anterior skull α rays with 20° tube tilt showed no increased soft tissue density or tumour calcification in the orbit. There was orbital dilatation and a wider superior orbital fissure on the affected side; otherwise there was no abnormality in the orbital or periorbital region.

Case 1, a 10-year-old boy, had right proptosis of 20 mm. (left side 16 mm.) of unexplained origin of 2 months' duration (Fig. 1). Both eyes and fundi were normal with visual acuity 6/6. While he was in the hospital for investigation before orbital exploration, another child struck him in play with the fist on the right eye, and the proptosis immediately disappeared, but was followed by upper and lower lid ecchymosis (Fig. 2). A ruptured orbital blood cyst was diagnosed and the blood staining of the lids disappeared in one month.

Progress

One year later the boy presented again with severe right proptosis of 30 mm. of 6 days' duration (Fig. 3). There was oedema of the lids, conjunctival chemosis, and limitation of ocular movement.

FIG. 1 Case 1. Right proptosis of unexplained origin of 2 months' duration in a boy aged 10 years

FIG. 2 The same boy after a fist blow on the right eye, showing disappearance of proptosis and appearance of ecchymosis of lids

in all directions. A large corneal ulcer due to exposure prevented fundus examination and the visual acuity was no perception of light. The proptosis was thought to be due to a rapidly growing malignant tumour of the orbit. A large cystic mass was felt above the globe, and postero-anterior skull x rays showed a wider right orbital cavity (Fig. 4).

FIG. 3 The same boy one year later, showing severe right proptosis of 6 days' duration with absent ocular movements and corneal ulcer. Orbital exploration showed a huge blood cyst 3×3 cm. above the globe extending to the muscle cone space

FIG. 4 Case 1. Postero-anterior skull x ray, showing wider right orbital cavity

Operation

Orbital exploration through an upper conjunctival fornix incision showed a large bluish cyst. On blunt little-finger dissection the cyst ruptured, evacuating chocolate-coloured altered blood. Further blunt little-finger dissection showed that the cyst extended above the globe and optic nerve. The cyst was removed and was found to measure about 3×3 cm. Fig. 5 (overleaf) shows the patient's appearance 2 weeks later.

Histopathological examination

The large blood cyst had an endothelial lining and a fibrous wall. Outside the cyst were many cavernous haemangiomatous spaces (Fig. 6, overleaf) and a large empty endothelium-lined cystic space (Fig. 7, overleaf).

FIG. 5 *The same boy 2 weeks after surgical removal of right orbital blood cyst*

FIG. 6 *Case 1. Part of the removed cyst, showing endothelial lining, a fibrous wall, and non-encapsulated cavernous haemangioma spaces outside cyst wall. $\times 120$*

FIG. 7 *Case 1. Empty cystic space lined by endothelium present outside blood cyst wall, showing origin of orbital blood cyst. $\times 540$*

Case 2, a 30-year-old man, had left proptosis of 22 mm. (right side 16 mm.) of 3 years' duration (Fig. 8, opposite). The left eye showed upward limitation of ocular movements. A cystic mass was felt in the upper inner part of the left orbital cavity. Both fundi were normal with visual acuity 6/s. A postero-anterior skull x ray showed a dilated left orbital cavity and a wider superior orbital fissure (Fig. 9, opposite).

Operation

Orbital exploration through an upper fornix conjunctival incision showed a large bluish blood cyst 3×2 cm. extending through the superior orbital fissure to the cranium. Most of the orbital part of the cyst was removed.

FIG. 8 Case 2. *Left proptosis of 3 years' duration in a man aged 30 years*

FIG. 9 Case 2. *Postero-anterior skull x ray, showing wider left orbital cavity and superior orbital fissure*

Histopathological examination

The blood cyst had an endothelial lining and a fibrous wall (Fig. 10). Outside the cyst wall was another cystic space lined by endothelium filled with a few blood cells (Fig. 11) and other non-encapsulated cavernous haemangiomatic formations.

FIG. 10 Case 2. *Part of removed cyst, showing endothelial lining and fibrous wall. ×90*

FIG. 11 Case 2. *Large cystic space lined by endothelium (containing blood corpuscles) attached to blood cyst wall, showing origin of orbital blood cyst. ×405*

Discussion

A retrobulbar haemorrhage occurring after trauma or retrobulbar injection usually gives rise to blood infiltration of the orbital tissues that absorbs in time and does not usually give rise to a blood cyst. That such cysts originate in cavernous lymphangiomas is possible, but the orbit is known to be free of lymph vessels and in the two cases described here there was no lymphangioma of the lids, orbit, or any other part of the body. In neither case had there been trauma which might cause necrosis of orbital fat. These cases show that most orbital blood cysts start as cystic empty spaces lined by endothelium, being part of a non-encapsulated cavernous haemangiomatic malformation. When these empty pre-existing spaces become filled with blood (as for example after a strain) they give rise to blood cysts.

A small blood cyst measuring 1×1 cm. in the muscle cone space may cause proptosis (Mortada, 1962, 1963, 1965, 1968). If it presses on the area of the superior orbital fissure, it may cause the superior orbital fissure syndrome or orbital apex syndrome (Mortada, 1961). Such cysts are usually small, but may extend outside the muscle cone space to reach forwards into the subconjunctival space or backwards to the cranium through the superior orbital fissure. In the first case described above, the proptosis subsided when the thin-walled blood cyst was ruptured by a blow and the blood penetrated into the tissue of the eyelids. The proptosis recurred when blood filled another pre-existing empty space. Such orbital blood cysts are best removed by way of a Krönlein orbitotomy.

Summary

(1) Blood cysts of the orbit usually originate in one or more empty cystic spaces lined by endothelium associated with a small non-encapsulated cavernous haemangiomatic malformation, which became filled with blood. They may become as large as 3×3 cm. The commonest site is the orbital apex and the muscle cone space.

(2) Such cysts may simulate a malignant orbital tumour with severe proptosis, limitation of ocular movements, lid oedema, and conjunctival chemosis as in Case 1.

(3) Such cysts may also extend into the cranium through the superior orbital fissure as in Case 2.

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