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IBIS HOTEL, MOOREA, FRENCH POLYNESIA

BLINDNESS DUE TO EXTRAOCULAR PRESSURE

AN UNUSUAL CASE FOR HYPERBARIC OXYGEN TREATMENT

Peter McCartney

The patient was a fit, 37 year old man, Mr AS. Towards the end of an informal family game of cricket, a cricket ball struck Mr AS on the left orbit causing severe pain and a feeling of fullness above and below the eye.

The patient felt that if he blew his nose, he would relieve the fullness. He did this within two minutes of the injury, and in his own words "I immediately knew I had done the wrong thing".

The pain above and below the orbit became more severe, and he had double vision. The double vision cleared within 5 minutes and he could see again, but he was still in pain.

His wife drove him home, arriving at about 7.00 pm. The swelling did not seem to be great, and after a meal he felt more comfortable and went to bed. This was about 8.30 pm. His overall state seemed to him to have improved, and although the eye was a little swollen, he felt it was not bulging and he settled and went to sleep peacefully.

He woke around midnight, with severe pain and a feeling of sheer panic. He jumped out of bed and ran about. His wife managed to calm him, and they both realised his eye was bulging.

He took two disprin, and this had no effect, so he took two Panadol. This also had no effect, and he started vomiting. It was decided to ask for medical advice. The family doctor was away and they knew this, so they phoned a doctor in Sandy Bay, 24 kilometres away, and asked him if he would come out and help. The doctor agreed to this and made the journey.

On arrival, the doctor made an attempt to wash the eye and examine it, but quickly decided that the swelling was to great to permit any examination, and took the patient to the Royal Hobart Hospital in his car.

On examination at the Royal Hobart Hospital, he had marked exophthalmos on the left with an increased intraocular pressure due to pressure of the surrounding tissues on the globe. There was no perception of light in the left eye which had an unreactive pupil. Ophthalmoscopy showed an exsanguinated fundus.

His management included adequate analgesia. A lateral canthotomy was performed and he was given diamox and mannitol. Massage of the globe of the eye was also performed.

CAT scans were performed. An axial scan through the orbits showed (L) proptosis and a considerable amount of air inside and outside the muscle core. A more caudal scan again showed extensive air within the orbits as well as fractures involving the orbital wall posteriorly and the adjacent ethmoid. The optic nerve appeared uninterrupted. A scan through the maxillary sinuses showed opacification of the left maxillary sinus. There was subcutaneous air over the anterior wall of the left maxillary sinus. Finally a coronal scan showed a fractured left orbital floor, air in the left orbit and an opacified left maxillary sinus.

This man had an apical fracture of his left orbit with no evidence of direct bony compression of the optic nerve. There was air in the orbit and he had a blind eye due to external pressure on the eye.

The retinal artery is narrow, and is an end artery system. It supplies only 30 per cent of the retina's oxygen requirements. It has intrinsic autoregulation of flow, PO_2 and PCO_2 being the two regulators. High PO_2 causes vasoconstriction while a high PCO_2 causes vasodilation.

In contrast, the choroidal system is a wide bore network. Venous oxygen saturation is an astonishing 95 per cent. Flow is regulated by the sympathetic nervous system and accounts for a 70 per cent share of the retina's oxygen supply. These features of the blood supply to the eye are shown in Figure 1.

Once the intraocular pressure rises above arterial pressure, blood no longer perfuses the eye. The same time constraints for anoxia apply to the eye as for brain tissue.

It was considered that orbital decompression would be of benefit, but in view of the long delay, possibly unsuccessful. An optic canal decompression procedure was offered to the patient by the neurosurgeon. The patient declined this. One factor in this decision was that his father had died following neurosurgery.

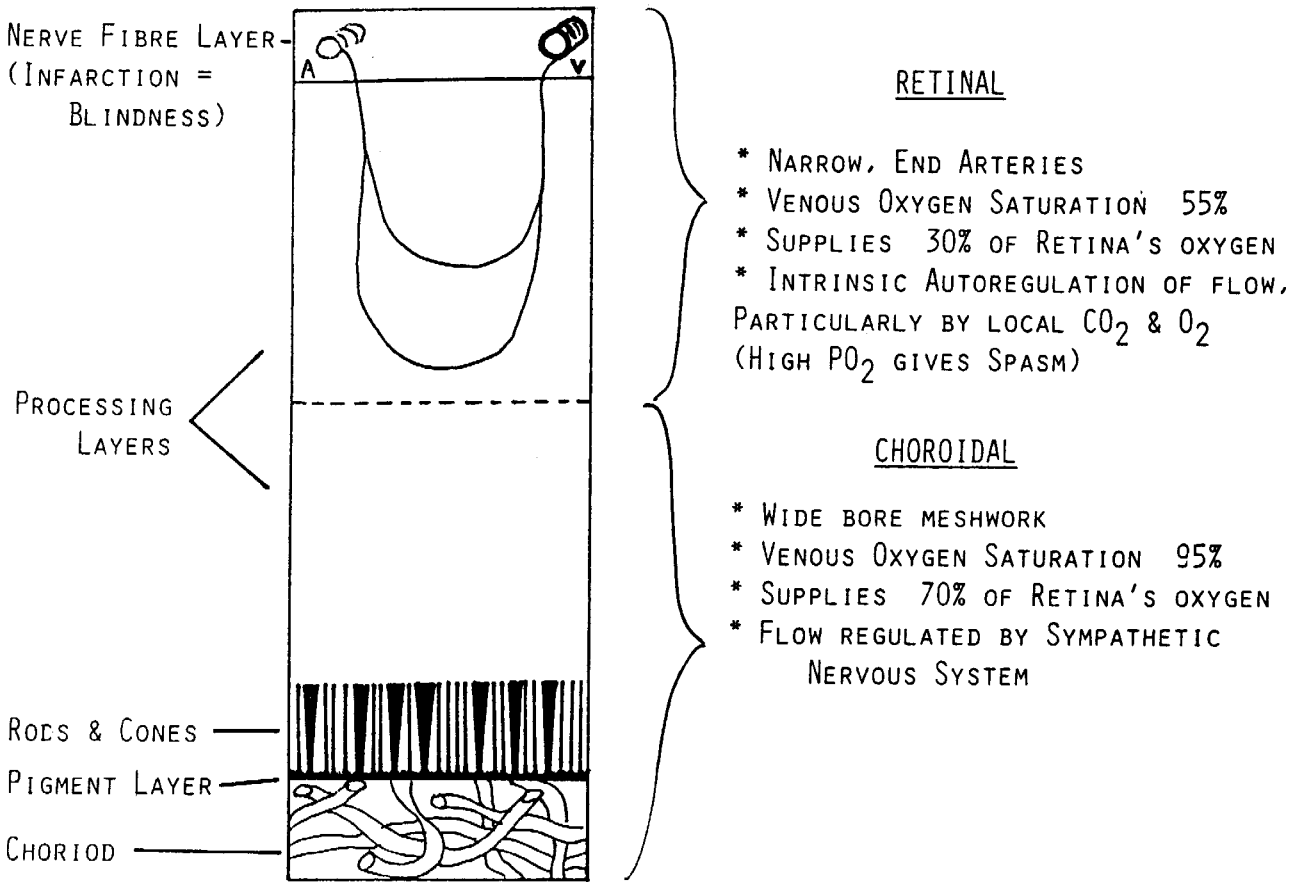
Therapeutic compression breathing oxygen was ultimately decided upon as the air mass was thought to be the major factor in producing the raised intraorbital pressure.

He was compressed to a pressure equivalent of 9 metres of seawater (MSW) (30 feet of seawater (FSW)) and put on oxygen. The compression profile was

	MINUTES	MSW
12.51	zero	surface
12.56	+5	9
13.56	+65	9
14.26	+95	surface

After treatment there was decreased proptosis, his discomfort diminished. The blood flow in the eye returned to normal however his vision and pupillary responses were unchanged.

THE RETINAL AND CHOROIDAL CIRCULATIONS



CROSS SECTION OF RETINA

If compression and hyperbaric oxygen had not been used he would have been a candidate for enucleation. At the time of writing, both his eyes appear normal, and move normally. There is only a small supero-temporal area of visual field left in the left eye. There is no pain or discomfort. The patient has made a good adjustment to his injury, and is grateful for the treatment as he realises that the injury could have resulted in him losing his eye.

Thanks are expressed to Drs E Ryman, Deputy Director, Royal Hobart Hospital; Michael Treplin, Ophthalmic Consultant to the Royal Hobart Hospital, David Griffiths and Michael Martyn, Department of Anaesthesia, Royal Hobart Hospital; and G Brian, Department of Ophthalmology, Royal Hobart Hospital.

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PULMONARY BAROTRAUMA OR SPONTANEOUS PNEUMOTHORAX
A CASE PRESENTATION

Beris Ford

Let me introduce you to my area. I live in Whangarei which is 160 km north of Auckland, New Zealand, and is in the middle of a long isthmus, the East Coast of which is popular for scuba diving. The Poor Knights Group of Islands lie 30 km off the coast. They are New Zealand's Mecca for scuba divers and about 20,000 dives per year are done here and perhaps 250,000 in all of Northland.

J, a part Maori, was 20 years old when she came in to see me for a scuba diving medical. There was not much in her history, a couple of bouts of cough with sputum, and occasional nasal obstruction. There was nothing much in the examination except she had larger lungs than predicted, Vital Capacity (VC) 4.3 1, predicted, 3.8 1, Forced Expiratory Volume in 1 second, 3.45 1, predicted, 3.25 1, and a slight reduction in percentage FEV/VC, actual 80 per cent, predicted 88 per cent.