

Rapid Recovery Hyperbarics

9439 Archibald Ave. Suite 104 Rancho Cucamonga CA, 91730

909.477.4545 | www.hbot4u.com



P.V.L. Periventricular Leucomalacia

"PVL" **Peri Ventricular Leucomalacia**. Peri - means around; Ventricular - the lateral ventricles of the hemispheres; Leuco - white matter; malacia - means degeneration. This is not a diagnosis it is a pathological description just as multiple sclerosis is also a description - in this case multiple meaning many, and sclerosis simply scarring. PVL occurs, as the result of midbrain damage from a number of causes and "MS" is one of them. The reason for the vulnerability of the mid brain is because the blood supply of the white matter is unusual. There are areas, which depend on veins where the zone around the vein is devoid of capillaries.

(1) Normally the exchange of oxygen nutrients and waste products is at capillary level. The problem with relying on venous blood for oxygenation is that most of the oxygen has been extracted from the blood before it reaches the veins. So if any event reduces the oxygenation supplied to the body and brain as, for example, in strangulation the areas of the brain relying on venous oxygenation suffer. That is, the veins dilate - increase in diameter - and become more permeable. In fact the wall can become so permeable that even red blood cells escape into the surrounding tissue. These hemorrhages, which form a ring around the vessel, are called petechial hemorrhages. This leakage - especially of red blood cells is very destructive - and the tissue can under autolysis leaving cystic change. PVL can result from cardiac surgery both in children (2) and adults (3) and these studies indicate that lesser degrees of tissue damage are recoverable. The key to improving the extent of recovery is improving oxygenation - using vasoconstriction to reduce permeability and improve oxygen transfer.

There are no specific articles on the use of oxygen therapy in **periventricular leukomalacia**. However recovery of PVL induced by the omission of filtration in cardiac surgery has been documented.

Muraoka R, Yokota M, Aoshima M, Kyoku I, Nomoto S, Kobayashi A, Nakano H, Ueda K, Saito A, Hojo H.

Subclinical changes in brain morphology following cardiac operations as reflected by computed tomographic scans of the brain. J Thorac Cardiovasc Surg 1981;81:364-69.

The widening of the ventricles was followed by CT in children after cardiac surgery without filtration for microemboli. However the loss on midbrain volume (widening of the ventricles) was not permanent. This recovery occurred breathing air - in other words there was sufficient oxygen in the air to allow recovery. Where the tissue process causes swelling it prevents sufficient oxygen reaching the tissue and recovery may not take place-breathing air. It is then necessary to increase the amount of oxygen in the gas breathed - which this may require a pressure chamber. However the extent to which recovery can take place depends upon the extent of the damage and at the present time we do not have the technology to accurately determine how much recovery can take place. It can be determined by the response to

Hyperbaric Oxygen treatment.

Best wishes

Philip James M.D.

Wolfson Hyperbaric Medicine Unit
- University of Dundee