

# TREATMENT OF SEVERE DECOMPRESSION SICKNESS IN SWINE WITH OXYGENT™, A PERFLUOROCARBON EMULSION.

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**BACKGROUND:** The US Navy seeks adjunctive treatments for severe decompression sickness (DCS) to be used when recompressive treatment is delayed or unavailable. Perfluorocarbon emulsion (PFC) has high dissolving capacity for gases. It has been hypothesized that PFC combined with 100% inspired oxygen (O<sub>2</sub>) would improve the outcome in severe DCS.

**METHODS:** Male Yorkshire swine (N = 45,  $\bar{x}$  = 21.3 kg ± 1.45 SD) were randomized to one of three groups, then compressed to 4.94 ATA on air for 22 hours and brought directly to the surface at 0.91 ATA/min. On reaching 1 ATA, the PFC group received IV infusion of 1 mg/kg methylprednisolone (MP) followed by 6 ml/kg of Oxygent™ (perflubron emulsion, Alliance Pharmaceutical Corp., San Diego, CA.), then breathed 100% O<sub>2</sub>. The O<sub>2</sub> group received 1 mg/kg MP, then breathed 100% O<sub>2</sub>. The MP group received 1 mg/kg MP, then breathed room air. Outcomes of non-fatal CNS or cardiopulmonary DCS and death were recorded. An earlier group of 12 untreated controls exposed to the same profile was also available for analysis.

**RESULTS:** Control: N=12, 10 DCS, 7 died. MP: N=15, 14 DCS, 7 died. O<sub>2</sub>: N=15, 13 DCS, 6 died. PFC: N=15, 8 DCS, 4 died. The control and MP groups were statistically indistinguishable and therefore combined for analysis. Post-dive O<sub>2</sub> breathing did not significantly reduce morbidity or mortality in this model. The PFC group sustained less DCS (p<0.01) and death (p<0.05).

**CONCLUSION:** Post-dive treatment with Oxygent™ and 100% O<sub>2</sub> significantly decreased the incidence of severe DCS and death after direct ascent from saturation.