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TITLE: PERITONEUM AS ANOTHER ROUTE OF OXYGEN DELIVERY TO BLOOD.
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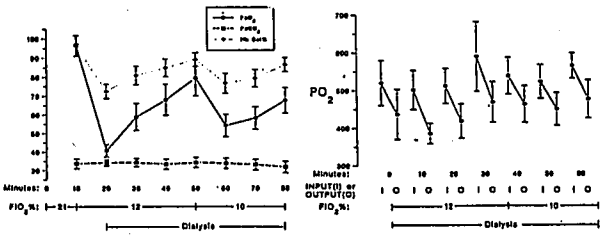
INTRODUCTION: The object of this study is to determine the efficacy of oxygen transfer through the peritoneum using well oxygenated dialysate fluid [Plasmalyte] in rabbits. Fick's principles can be applied to any membrane. Peritoneum has a large surface area and a good blood flow [25% of the blood flow in man].

There are methods of oxygen delivery which can be used for hypoxic situations including different methods of artificial ventilation: hyperbaric oxygenation: cardiopulmonary bypass. ECMO: IVOX: and the usage of flourocarbons and stroma free haemoglobin.
METHODS: With IRBAR approval we studied fifteen anaesthetized. artificially ventilated (N_2O/O_2 /- Isofluorane) rabbits. Two peritoneal cannulae were inserted. Arterial blood gases were taken with FIO_2 of 21%. 12% and 10%. Continuous oxygenated peritoneal dialysis with plasmalyte commenced. When FIO_2 reduced to 12%. pO_2 of input and output dialysate were also measured.
RESULTS: Show augmentation of oxygenation by the peritoneal route is possible and very satisfactory. The ability to maintain $PaCO_2$ at low levels showed the CO_2 elimination by this route is also possible and effective. The arterial pH remained constant.



DISCUSSION: In these hypoxic rabbit models, ability to deliver oxygen to blood by peritoneal route is very encouraging. As the solubility of O_2 in H_2O at room temperature is 3.3 vol/100 vol., to supply the total demand we need very high flows of dialysis. The gas transfer depend on the splanchnic blood flow (S.B.F.) and the exposed surface area to the dialysate, any fault in the delivery system will markedly reduce the adequacy of the oxygenation. Oxygen is also lost by the lungs due to second gas effect S.B.F. can be improved by adding a vasodilator like dopamine in low concentrations. The oxygen carrying capacity of the dialysate could be improved by using flourocarbons or stroma free haemoglobin. With proper usage of this technique one would be able to augment adequate oxygenation and elimination of CO_2 in a critically ill patient with respiratory failure.

Peritoneal route for this purpose has not been used before. This is a simple technique with very few complications, which shows promise of providing artificial lung capability with substantial advantages over existing methods. Further human studies is needed.
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TITLE: A FOURTH YEAR ELECTIVE IN CRITICAL CARE MEDICINE (CCM)
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Residents managing critically ill patients are expected to formulate pathophysiologic diagnosis, integrate quantitative and rapidly changing data, and learn elements of titrated care. They are challenged daily in their understanding of the ethical principles which guide decision making. The objective of this study was to determine if senior medical students could be taught basic principles of evaluation and complex patient management in an ICU.

We developed a 4 week elective in CCM for fourth-year students consisting of lectures, daily rounds, technical skills conferences, and procedure supervision. Lectures consisted of 12 informal practical reviews of respiratory, cardiovascular, CNS, renal, infectious disease and hepatic dysfunction followed by interactive discussions of practical management issues. Goals were to teach students analytic and decision making skills in an ICU environment. 5 technical conferences demonstrated airway management, intubation and ventilation, ABG analysis, central access for hemodynamic monitoring, interpreting hemodynamic profiles, arrhythmia recognition and nutrition. Students were supervised at the bedside during clinical implementation of their skills. Daily rounds stressed organization and presentation of data, differential diagnosis, and evaluating responses to therapy. Rounds were also used as the forum for discussion of informed consent, patient competency, advanced directives, foregoing life support and other essential ethical principles. Students were included in conferences with family members so that they observed a model of honest, sensitive discussion of difficult ethical issues.

We evaluated student's knowledge and ability to apply that knowledge with pre- and post-rotation short answer and essay exams. An example of one exam question was: Does a patient with ARDS, PaO_2 60mmHg, O_2 Sat. 96%, CO of 5 l/min on 90% FIO_2 and 5 PEEP require an increase in PEEP, why or why not? 28 students completed the exams, mean scores were 48%±12 and 86.2%±7 pre and post rotation. ($p<0.0001$ Wilcoxon Ranked Sum Test) Individual question results on ARDS management, hemodynamic profile recognition and analysis, and ventilation mechanics are displayed below.

	Exam Scores Pre-Rotation	Post-Rotation
ARDS Management	5/28(18%)	23/28 (82%)
Hemodynamic Profiles		
inadequate pre-load	16/28(57%)	27/28 (91%)
hyperdynamic	11/28(39%)	28/28 (100%)
Ventilator Mechanics	5/28(18%)	25/28 (89%)

Changes in pre- vs post- rotation scores suggest marked improvement in knowledge and skills. We conclude that an organized CCM clerkship, based on specific objectives and designed with established educational principles can improve medical students' understanding of complex, critically ill patients and their ability to discuss and manage them.