LIVERPOOL SOCIETY OF ANAESTHETISTS
Friday 17th November , 2006

‘Balanced Fluid Regime – A Useful Tool?’
Prof Monty Mythen, Professor of Anaesthesia and Critical Care,
University College London

PRESENT
1. Dr. John Chambers
2. Dr. E. Forrest
3. Dr. John Gannon
4. Dr. Shiv Singh
5. Dr. Kulkarni
6. Dr. Raymond Ahearn
7. Dr. C. Howard
8. Dr. R. Howard
9. Dr. C. Bell
10. Dr. F.Mostafa
11. Dr. W. Roberts
12. Dr. Jim Crooke
13. Dr. Brenda Phillips
14. Dr. David Gray
15. Dr. John Crooke
16. Dr. F.Ashworth
17. Dr. E. Vivori
18. Prof. R. S. Jones
19. Dr. A.Florence
20. Dr. Alex Dugdale
21. Dr. Khundkar
22. Dr. S.A.Khan Wrightington Hospital
23. Dr. Elizabeth Kingston
24. Dr. D.Sidaras
25. Dr. C. Bell
26. Dr. Simon Mercer
27. Dr. T. Cope
28. Dr. G. Saba
29. Dr. Damani
30. Dr. R.Parikh
31. Dr. G.George
32. Dr. T. Szakmany
33. Dr. T. Nightingale
34. Dr. Jagadeesh
35. Dr. L. Raj
36. Dr. E. Docker
37. Dr. R. Sindhu
38. Dr. R. Emery
39. Dr. P. Michael
40. Dr. S. Pathmanathan
41. Dr. L. Parker
42. Dr. G. Bugelli, Glan Clwyd
43. Dr. Tom Bryson
44. Dr. Muthu
45. Dr. N.Daniel
46. Dr. Siohban Leith

APOLOGIES
1. Dr. J. Watt
2. Prof. Hunter
3. Dr. Patrick Mullen
4. Dr. Roger Thornton
5. Dr. Joan Kelly
6. Dr. A. Holden
7. Dr. J.Riding
8. Dr. B.Bickerstaffe
9. Dr. P.Atherton
10. Dr J.Rodriguez
11. Dr. R.O’Kell
12. Dr. R.MacMillan
The meeting commenced at 19.00 with a welcome from the new President, Dr John Chambers. Following the brief reading of the minutes of the last meeting, Dr Chambers introduced the speaker from University College London, Professor Monty Mythen.

Prof Mythen started by looking at the constituents of electrolyte solutions normally used in clinical practice. In particular he looked at normal saline which he claimed was a misnomer and should be more accurately called abnormal saline. This is because although it may have an osmolarity similar to plasma, it is both acidic and hyperchloraemic. Hartmann’s or lactated Ringer’s solution is a more normal physiological solution. The hyperchloraemic metabolic acidosis associated with the administration of normal saline is now recognised but does it matter?

A meta analysis by Burdett et al (TATM 2004) addressed this issue and showed that the administration of 2-3 litres of normal saline was associated with a hyperchloraemic metabolic acidosis and a base deficit of between -4 and -6. Williams et al (Anesthesia & Analgesia. 88(5):999-1003, 1999) looked at the consequences of administering 50mls/kg of saline or lactated Ringer’s solution (~3 litres in 1 hour) to 18 healthy volunteers. The saline group dropped their pH to as much as 7.2 with a base deficit of up to -10. Hyperchloraemia both reduced renal blood flow and urine production. 80% of subjects in the saline group had CNS symptoms and 50% had abdominal discomfort. A study by Wilkes (Anesth Analg. 93(4):811-6, 2001 Oct.) on the differences of starch in either saline or lactated Ringers showed that 70% of patients developed a hyperchloraemic metabolic acidosis whereas in the LR group, no patient developed a metabolic acidosis and had better GI perfusion. Other effects in the saline group were a reduction in urine output and mental activity.

Hyperchloraemia causes renal vasoconstriction and a reduction in GFR and the reduction in renal blood flow correlates with plasma chloride when it goes above 110mM/l, an association not seen in the femoral artery.

Prof Mythen then looked at the work of O’Malley after a survey of renal transplant centres on fluid therapy showed that saline was the usual fluid given to patients in order to avoid the potential for hyperkalaemia with lactated Ringers solution. In a subsequent study (Anesthesia & Analgesia. 100(5):1518-24), O’Malley showed that although there was no difference in graft survival, five (19%) patients in the saline group versus zero (0%) patients in the LR group had potassium concentrations of >6 mM/L and were treated for hyperkalaemia (P = 0.05). Eight (31%) patients in the saline group versus zero (0%) patients in the LR group were treated for metabolic acidosis (P = 0.004). Saline did not adversely affect renal function. LR was associated with less hyperkalaemia and acidosis compared with saline.

A study in JAMA by Merten GJ (JAMA. 291(19):2328-34, 2004) showed that hydration with sodium bicarbonate before contrast exposure is more effective than hydration with normal saline for prophylaxis of contrast-induced renal failure.

Prof Mythen suggested that the papers he had cited showed that a simple change in practice with its consequent avoidance of hyperchloraemic acidosis by changing from normal saline to Hartmann’s solution will significantly improve patient outcome.

He then briefly touched on the history of Sydney Ringer, a British physiologist, and the serendipitous substitution of water in his London laboratory in the 1880s leading to the discovery of his original solution. Alexis Hartmann subsequently changed it
with the addition of sodium lactate in 1932. despite the fact that Hartmann was an American, the UK is the only country to call lactated Ringer’s, Hartmann’s solution.

Prof Mythen then talked about his part in the forthcoming expedition to the Himalayas to look at oxygen utilisation in extreme conditions.

He then took questions from the floor. Dr Chambers started by asking about fluid loading in patients to prevent post-operative nausea and vomiting and whether n/saline had been used. Prof Mythen answered that the successful studies had all used Hartmann’s solution. He then asked about the use of hypertonic saline in resuscitation. Prof Mythen said that he thought that the hypertonicity was more important than the electrolyte composition. Dr Raymond Ahearn commented that Jackson Rees had said to him many years ago as a trainee that Hartmann’s improved the condition of children much better than saline.

When asked what colloids he regularly used, he said either Gelofusine or hydroxyethyl starch. He also commented that some new colloids would soon be introduced in balanced salt solution rather than saline.

John Sprigge gave the vote of thanks. The meeting finished at 20.20 and was followed by supper for all members.

Ewen Forrest
18/11/06