

I refer to Professor Savage's comments on peritoneal dialysis (PD):

- 1) He makes many of the points about the mechanisms of PD which I made in my report on this subject (dated 11/11/11), such as the relative power of PD in children because of its relation to body surface area, which did not appear in his earlier reports. This suggests to me that he has considered my observations and broadly agrees with them.
- 2) He 'estimates' the possible fluid balances that could be achieved as a result of the fluids he was given and the effect of PD after his admission to the ward in 2 separate ways, and these appear to produce 2 very different results; that he could have been between 300 and 500 ml dehydrated, and that he could have had an extra 225 ml fluid on board. The second of these is the more valid/ accurate assessment. The reasons are below:
  - a. The first approach is to take the previous 24 hours estimated fluid intake, and to deduct from it the estimated usual urine output (which we can assume to be relatively fixed under normal circumstances) and the quantity of fluid estimated to have been lost by PD.

In this case, Prof Savage argues that his usual intake was 2100 ml, his usual urine output was about 1500 ml. He should have added that his usual PD losses were about 300 ml, giving a balance of +300 ml in the day, which is the approximate amount that he might lose insensibly from sweat, in exhaled breath, and in stools, thus:

$$\text{Balance} = 2100 \text{ intake} - (1500 \text{ urine} + 300 \text{ PD} + 300 \text{ insensible}) = 0 \text{ ml}$$

He goes on to argue that his intake that day was recorded as 1552 ml, which is 548 ml less than usual, and concludes that this would mean that he would have been between 300 and 500 ml in deficit. I can only conclude that he is assuming that his PD losses would have been less than usual, perhaps as low as previously recorded at about 50 ml instead of the mean of about 300 ml, so that the equation would have been as follows:

$$\text{Balance} = 1552 \text{ intake} - (1500 \text{ urine} + 50 \text{ PD} + 300 \text{ insensible}) = -298 \text{ ml}$$

The problems with this approach, which is sometimes the only possible way of making the assessment if no more information is available, is that it is very crude, and assumes we know fairly precisely how much fluid is normally given, and precisely how much was taken during the particular 24 hours in question. It does not, for example, allow for the fact that a child may or may not have gone to the tap and had a drink during the day prior to being called in for the transplant, or a whole range of similar scenarios.

- b. The second approach is to take the most recent point of clinical assessment, and to work forward from there. This has the dual advantage of limiting the amount of time that one has to estimate over (so reducing cumulative errors), and in this case of the estimated time being one when he was under closer than usual observation. Thus, instead of guessing exactly what happened to him during the previous 24 hours, it is only necessary to evaluate the charts recording what actually happened during the approximately 12 hours between his admission and the onset of surgery.

Taking this approach, Prof Savage concludes (rather more precisely) that Adam gained 225 ml between his admission and going to theatre.

The next question is what was his clinical status on arrival. The entry in the medical notes then was that Adam was "well at present", which is not surprising as he was called in at the end of what was until then just an ordinary day for him. He was also examined by both the paediatric registrar and by Prof (then Dr) Savage himself on admission, and neither made any note to the effect that Adam appeared to be dehydrated. His vital signs were unremarkable too. Although there is not specifically an entry into his notes to state that he was fully hydrated on examination, the above facts all indicate that this would have been the case. I would take the term "well at

present" to indicate that he was not significantly dehydrated, especially considering that an assessment of his fluid status would have been one of the important aspects of his assessment for a renal transplant operation.

If he was both normally hydrated on admission, and went on to gain a further net 225 ml of fluid, he would have been well hydrated at the time of arrival in theatre.

To suggest both that he may have been between 300 and 500 ml dehydrated on arrival in theatre, and to that he would have gained net 225 ml since his admission, would imply that he must have been between about 525 and 725 ml dehydrated on admission. This would have been grossly obvious.

If Prof Savage's estimates of Adam's fluid intakes and outputs using the crude '24 hour' method indicated that he may be as much as 500 ml dehydrated by the time of arrival in theatre, he should have taken measures to avoid this. These would have included giving an extra volume of normal saline in addition to the other fluids already prescribed, and more importantly to monitor Adam's weight from admission as a way of determining if he was gaining or losing fluid.

- 3) My opinion is that Adam was either normally hydrated when he was examined on admission, or was so minimally dehydrated that it was not detectable clinically. I agree that his net fluid balance between admission and theatre was likely to have been positive, which means that he would either have been in approximately normal fluid balance by then, or slightly positive, which is the ideal situation to begin a renal transplant.

## Expert Witness Declaration

I Malcolm Coulthard DECLARE THAT:

- 1) I understand that my duty in providing written reports and giving evidence is to help the Court, and that this duty overrides any obligation to the party by whom I am engaged or the person who has paid or is liable to pay me. I confirm that I have complied and will continue to comply with my duty.
- 2) I confirm that I have not entered into any arrangement where the amount or payment of my fees is in any way dependent on the outcome of the case.
- 3) I know of no conflict of interest of any kind, other than any which I have disclosed in my report.
- 4) I do not consider that any interest which I have disclosed affects my suitability as an expert witness on any issues on which I have given evidence.
- 5) I will advise the party by whom I am instructed if, between the date of my report and the trial, there is any change in circumstances which affect my answers to points 3 and 4 above.
- 6) I have shown the sources of all information I have used.
- 7) I have exercised reasonable care and skill in order to be accurate and complete in preparing this report.
- 8) I have endeavoured to include in my report those matters, of which I have knowledge or of which I have been made aware, that might adversely affect the validity of my opinion. I have clearly stated any qualifications to my opinion.
- 9) I have not, without forming an independent view, included or excluded anything which has been suggested to me by others, including my instructing lawyers.
- 10) I will notify those instructing me immediately and confirm in writing if, for any reason, my existing report requires any correction or qualification.
- 11) I understand that;
  - 11.1) my report will form the evidence to be given under oath or affirmation;
  - 11.2) questions may be put to me in writing for the purposes of clarifying my report and that my answers shall be treated as part of my report and covered by my statement of truth;
  - 11.3) the court may at any stage direct a discussion to take place between experts for the purpose of identifying and discussing the expert issues in the proceedings, where possible reaching an agreed opinion on those issues and identifying what action, if any, may be taken to resolve any of the outstanding issues between the parties;
  - 11.4) the court may direct that following a discussion between the experts that a statement should be prepared showing those issues which are agreed, and those issues which are not agreed, together with a summary of the reasons for disagreeing;
  - 11.5) I may be required to attend court to be cross-examined on my report by a cross-examiner assisted by an expert;
  - 11.6) I am likely to be the subject of public adverse criticism by the judge if the Court concludes that I have not taken reasonable care in trying to meet the standards set out above.
- 12) I have read Part 35 of the Civil Procedure Rules and the accompanying practice direction including the "Protocol for Instruction of Experts to give Evidence in Civil Claims" and I have complied with their requirements.
- 13) I am aware of the practice direction on pre-action conduct. I have acted in accordance with the Code of Practice for Experts.

### Statement of Truth

I confirm that I have made clear which facts and matters referred to in this report are within my own knowledge and which are not. Those that are within my own knowledge I confirm to be true. The opinions I have expressed represent my true and complete professional opinions on the matters to which they refer.



Signed \_\_\_\_\_ Dr Malcolm Coulthard

Dated \_\_\_\_\_ 17/04/2012

**Dr Malcolm Coulthard, BSc, MB BS, DCH, FRCP, FRCPC, PhD**