Supplementary statement regarding Adam Strain to the Inquiry for Hyponatraemia Related Deaths in Northern Ireland

Dr Simon R Haynes

Signed: Simon R. Haynes

Date: 30th April 2012 30th April 2012

1: Atracurium administration by Dr Taylor during the course of Adam's operation.

I have previously stated that the anaesthetic *per se* administered to Adam Strain by Dr Taylor was appropriate. I would like however to further discuss the use of one of the drugs, atracurium:

- Atracurium is a muscle relaxant drug which blocks the neuromuscular junction. Following a dose of 0.5 - 0.7 mg/kg the effect is usually in the order of 20 - 40 minutes duration. Its removal from the circulation is independent of renal function, it being degraded by a process known as Hoffman elimination. Therefore it is a good choice of drug in the presence of renal impairment or failure - it does not accumulate or have a prolonged effect - unlike other drugs dependant on renal clearance.

- A muscle relaxant is used to provide paralysis during anaesthesia for two reasons: firstly it allows tracheal intubation and subsequent mechanical ventilation, and secondly muscle relaxation of the abdominal or chest wall allows easier and improved surgical access to body cavities. Muscle relaxation facilitates closure of the surgical incision, and it is usually the case that further drug is given at the time an abdominal wound is closed. According to the anaesthetic chart (058 - 003 - 005) Adam received atracurium as follows:

- 10mg at 0700
- 10mg at 0730
- 10mg at 0800
- 5mg at 0830
- 10 mg at 0930
- None from then onwards. Closure of the surgical incision is unlikely to have commenced prior to 1030h at the earliest.

There are several possibilities as to why no atracurium is recorded as having being given after 0930h. The possibilities are:

- Further doses were given but not recorded; I think this unlikely because of the otherwise apparent completeness of the record
- That an excessive dose had been given between 0700 and 0930, with an effect lasting up to and beyond 1100h; I think this unlikely. The simplest way to analyse this is to say that 45mg of atracurium was given to provide muscle relaxation from 0700h – 1000h. This is 0.75 mg/kg/hour, which is an acceptable dose. It is my view that the actions of the atracurium given as charted would be no longer evident by 1030h.
- That halothane anaesthesia combined with epidural nerve blockade produced adequate muscle relaxation in the surgical field, and that neuromuscular blocking drugs were not actually required. This is a possibility - but the question is then asked whether the previous repeated doses were given pre-emptively by rote (as is often the case) or because of increased muscle tone in the operative field or coughing in response to the tracheal

tube stimulus (as is also often the case)

- That Adam had suffered brain stem death by the the time the abdominal incision was being closed (ie 1030 onwards). It has to be noted that following brain stem death reflex muscle contraction can still take place in response to noxious stimulus. The reflex is purely at a spinal level. However the usual situation at this point is complete loss of muscle tone. *It is my opinion after giving the issue considerable thought that this is the likeliest reason not to have given muscle relaxant after 0930h.*

2: Insertion of urinary catheter: it is common, but not universal, practice for the bladder to be catheterized if lumbar epidural analgesia is to be continued during the postoperative period, regardless of the type of operation. This is because the sensation from the bladder is diminished by the epidural. In my non-cardiac practice urinary catheterisation is carried out following induction of anaesthesia and epidural placement either by, myself, a member of the nursing team, or by a member of the surgical team. As I have previously stated Adam was undergoing major surgery of several hours duration, with the likelihood of significant bleeding, and some anticipated difficulties with the management of his fluid balance. It is my opinion that there was a strong indication for placement of a bladder catheter at the start of the transplant operation to help guide fluid management. Had it proven impossible for bladder catheterization to have been performed at this point it would have not meant that the operation could not proceed, but one of the guiding factors for fluid administration would not have been present. It is implicit in the process of renal transplantation that urinary drainage would be ensured at the end of the operation, thus dealing with the need imposed by continuing epidural analgesia.

3: Brain stem death testing: I have previously provided the Inquiry with the appropriate reference regarding the legislation in the UK for the diagnosis of brain stem death. As the Inquiry will note, the diagnosis of brain stem death is a clinical diagnosis, made at the bedside by two suitably experienced doctors on two separate occasions when clinical assessment of brain stem function is made. Both doctors have to ascertain on each occasion that there is an underlying, identifiable, *cause* for brain stem death - which in Adam's case was cerebral oedema, and that other causes of coma are excluded – namely drugs and metabolic causes. Pharmacological causes (drugs) of coma were not present in Adam and can be excluded. I note that on the document whereby Adam was certified as brain stem dead (058 – 004 – 009) there are prompts ensuring that pharmacologic causes of coma (or apparent coma) are excluded, but no prompts regarding metabolic status. I have been furnished with an incomplete (in that precise timings have not been shown) PICU flow sheet of results (057 – 007 – 008) which shows that Adam's serum sodium was at its highest, 125 mmol/l between the time of admission to PICU and his death on 28/11/1995. The guidelines for brain stem death testing state that that the certifying doctors have to *be satisfied* that metabolic causes of coma are excluded. It would have been preferable if Adam's hyponatraemia had been better corrected, if not by the time

time of the second examination on 28/11/1995 at 0910h.

Expert witness declaration

I, Simon Haynes 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 3 and 4 above

6: I have shown all the sources of 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 been made aware, that might adversely affect the validity of my opinion. I have clearly stated my 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 notofy 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 the report and that my answers shall be treated as part of my report and covered by the 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 issue 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 the 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 uin 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 Simon R. Haynes

Dated:
30th April 2012 30th April 2012

Dr Simon Haynes MBChB, FRCA