reactivity was associated with fewer days of acute brain dysfunction and that early physical therapy may be a potential mechanism to improve endothelial function. These data support that endothelial dysfunction may be an important prognostic marker of acute brain dysfunction in critically ill patients and that endothelial modulation could serve as a potential means by which to reduce the duration of acute brain dysfunction.

Declaration of interest

None declared.

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Fig 1. Association between change in endothelial vascular reactivity and concurrent delirium/coma-free days. Improvement in endothelial vascular reactivity, indicated on the x-axis by an increase in the reactive hyperemia index (RHI) from enrolment to the second assessment, was associated with improved brain dysfunction, indicated on the y-axis by increased delirium/coma-free days, among all patients after adjusting for covariates (P=0.02). This association was modified by the baseline RHI (P for interaction=0.10).

References


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Randomized controlled pilot study: does intraoperative clonidine reduce the incidence of post-hospitalization negative behaviour changes in children who are distressed during induction of general anaesthesia?

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Editor—Undergoing general anaesthesia is distressing for children, up to three quarters of whom develop postoperative negative behaviour changes (PNBC) lasting for days or weeks after discharge home.1 Distress during induction of anaesthesia is strongly associated with PNBC.2 The management of preoperative anxiety by pharmacological or non-pharmacologic methods has been shown to reduce anxiety during induction of anaesthesia, and the incidence of PNBC.3 4 However, some children, who do not appear anxious preoperatively, unexpectedly become extremely agitated during induction.
of anaesthesia. These children are at high-risk of developing negative postoperative behaviours, but there are no published studies assessing whether an intervention during anaesthesia may reduce the incidence and severity of PNBC in these children.

Our long-term aim is to study whether an intraoperative dose of clonidine can reduce this behavioural morbidity in children who become distressed during anaesthetic induction.

Clonidine is an alpha-2 adrenoceptor agonist widely used perioperatively for its beneficial behavioural effects. A recent systematic review of the postoperative behavioural effects of intraoperative alpha-2 agonists demonstrated a reduction in emergence agitation/delirium, but found no studies assessing PNBC.5

This pilot study was designed to assess feasibility of recruitment, randomization, use of measurement tools and follow up, before performing a fully powered randomized controlled study.

Approval for the study was obtained from the National Research Ethics Service (South West – central Bristol). Written informed consent was obtained from the legal guardian of each child.

Healthy children aged two to 10 yr attending the Bristol Dental Hospital for extraction of teeth under general anaesthesia were invited to take part in the study. Behaviour during induction of anaesthesia was scored by the anaesthetist using the Paediatric Anaesthesia Behaviour score. Children who were scored ‘sad’ or ‘mad’ were randomized online (sealedenvelope.com) to one of three groups: clonidine 1 mcg kg\(^{-1}\) i.v.; clonidine 2 mcg kg\(^{-1}\) i.v.; or no additional medication.

Anaesthetic technique and analgesia were standardized. The following postoperative scales were completed by researchers blinded to allocation group: PAED scale; Watcha score; and a visual analogue pain scale. Vernon’s post-hospitalisation behaviour questionnaire was performed over the telephone on days one and seven after discharge home. Additional data was collected including length of time in the recovery room (PACU).

We aimed to randomize 45 children into three groups of 15. From a previous observational study, we anticipated that we would need to recruit approximately 135 children to achieve this. This pilot study was not powered to allow examination of differences between groups.

The study took place between September 2013 and March 2014. One hundred and forty-five children were recruited in order to randomize 45 (99 children were ‘happy’ during induction of anaesthesia, and another child was eligible but not randomized because of a computer problem). Subjects age ranged from two to nine yr (mean 6 yr).

Complete follow up data (including postoperative telephone questionnaires on day one and day seven) was collected for 40 children (89%). No practical problems of recruitment or data collection were identified.

Comparison of the 45 children who were randomized with the 99 who were not, did not reveal statistically significant differences in: age; previous general anaesthetics; or previous traumatic healthcare related experiences. No patient characteristic differences were identified between the three randomized groups.

This pilot study was not powered to identify differences between the randomized groups. However, for interest a summary of the results is shown in Table 1. None of the observed differences were statistically significant.

This pilot has demonstrated the feasibility of performing a fully powered study. Recruitment was not challenging and the study was completed within the expected six months. Complete data collection was achieved in 89% of patients, which is very respectable for a study involving postoperative follow-up. There is debate within the paediatric anaesthesia community regarding whether Vernon’s post-hospitalisation behaviour questionnaire remains the best measure of postoperative behaviour change, given that it was first introduced in 1966. An alternative measure may be more appropriate for the definitive study.

**Table 1** Summary of the findings for each group of randomized children. Values are median[IQR] or number. *PAED – Pediatric Anaesthesia Emergence Delirium Scale. †PNBC – Postoperative negative behaviour change. ‡PHBQ – Post-hospitalization behaviour questionnaire

<table>
<thead>
<tr>
<th>Clonidine dose (mcg kg(^{-1}))</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5 (3–9)</td>
<td>6 (2–9)</td>
<td>6 (3–8)</td>
</tr>
<tr>
<td>Number of children who had previously had a GA</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Number of children who had previously had a traumatic healthcare experience</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Watcha Score</td>
<td>1 [1–2]</td>
<td>1 [1–2]</td>
<td>1 [1–1]</td>
</tr>
<tr>
<td>Mean pain score (on 100 mm scale)</td>
<td>0.3 mm</td>
<td>0.3 mm</td>
<td>1.1 mm</td>
</tr>
<tr>
<td>Number of children exhibiting PNBC on day 1†</td>
<td>9 of 14 (64%)</td>
<td>11 of 15 (73%)</td>
<td>8 of 15 (53%)</td>
</tr>
<tr>
<td>Number of children exhibiting PNBC on day 7</td>
<td>4 of 13 (31%)</td>
<td>5 of 14 (36%)</td>
<td>3 of 15 (20%)</td>
</tr>
<tr>
<td>Mean number of PHBQ behaviour changes on day 1‡</td>
<td>1.9</td>
<td>3.2</td>
<td>1.5</td>
</tr>
<tr>
<td>Mean number of PHBQ behaviour changes on day 7</td>
<td>1.0</td>
<td>0.6</td>
<td>0.3</td>
</tr>
</tbody>
</table>

**Declaration of interest**

None declared.

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**References**

Preoperative ward

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Editor—Quality of preoperative care and operation theatre management in general hospitals of the developing countries is variable and tends to be far below par; this results in large number of cancellations on the day of surgery. Studies suggest that the cancellations on the day of surgery can range from 10–40% worldwide, 60% of which could potentially be avoided.1–2 Establishment of a preoperative ward can substantially minimize the problem. Regarding this facility, it should be located close to operating theatre complex, so that patients can be transferred within min, to reduce the delay to start of operation because of transport crisis or poor coordination between the ward and the theatre. There should be a separate facility each for emergency patients, routine patients, day or admitted patients and room for procedure and counseling. The preoperative ward should be led by anesthetists supported with adequate number of resident doctors, specialist preanaesthetic nurses and supporting staffs. The anesthetist would review the clinical findings, investigation reports; treat minor ailments to bring the patient in an optimum level for surgery and anaesthesia, thereby reducing the rate of patient cancellation because of patient factors. The absentee or ‘unfit’ patient can be replaced by others from the waiting list after coordinating with the surgeon much ahead of surgery.

The facilities should include equipment as necessary for general nursing care along with emergency resuscitation and monitoring. Basic laboratory and radiological and imaging facilities should also be available. The ward should allow routine preoperative and preanaesthetic preparation such as investigations, premedication, skin preparation, securing i.v. line, urinary catheterization, and taking informed consent; special and time consuming procedures such as central venous/arterial line establishment, epidural catheter placement, nerve block etc. should also be allowed here to save precious OT time. The ward can also serve as an ideal location for counseling, group discussion and education of the patient and family by a professional counselor/clergy.

The concept is not new, but it needs to be emphasized in particular in developing countries where the facilities in routine wards tend to be inadequate. Having a preoperative ward will lead to better utilization of the theatre time, reduction in of patient cancellations, and as a ‘one stop’ service it will ensure preanaesthetic checkup, review, premedication, investigations, subspecialist consultation, procedure, and education without much hassle for the patient.

Declaration of interest

None declared.

References


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