Herbal medicine use by children presenting for ambulatory anesthesia and surgery

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Summary
Background: Herbal medicine use has become increasingly popular throughout the world. Some of these agents may have serious interactions with anesthetic drugs. Children may potentially be more vulnerable to such interactions because of altered drug handling. While the prevalence of herbal medicine use by children with some chronic illnesses has been estimated, the incidence of this in a population of otherwise healthy children admitted for minor ambulatory anesthesia and surgery is currently unknown.

Methods: Parents of 601 children presenting consecutively for ambulatory surgery were asked to complete a questionnaire detailing administration of herbal medicines to their child.

Results: This study identified that 6.4% of children were currently taking an herbal preparation; while a further 10.1% had taken an herbal medicine in the past. Echinacea and arnica were the commonest used herbal remedies. A significant number of children had taken agents which may interact with anesthesia and surgery: St John’s Wort, valerian, garlic and gingko. Information on herbal medicines was mostly obtained by parents from nonmedical sources.

Conclusions: A total of 16.6% of children had a current or past history of ingestion of herbal medicines. This finding may have implications for the perioperative management of children presenting for day-case surgery.

Keywords: medicine; herbal; anesthesia; children

Introduction
Recent literature suggests that a significant proportion of adults presenting for surgery and anesthesia are self-administering herbal preparations (1,2). There have been several case reports highlighting the dangers of herbal medicines taken in combination with conventional prescribed medicines (3-5). In the context of anesthesia, where multiple drugs are administered over a short period of time, herbal products represent a potential risk to patient safety. This is particularly the case if the anesthetist is not aware that the patient is taking such a product. A review of the subject by Ang-Lee concluded that questions relating to herbal medicine use should now form part of our routine preoperative assessment (2).
Little is known about the use of herbal medicines in the pediatric population. As the majority of children admitted for day-case surgery are ASA I-II, few are taking prescribed medications. Thus, there is little possibility of interaction between conventional and herbal medicines in this population in the community (6). However, the potential for interaction with drugs administered during the induction and maintenance of anesthesia does exist. This study aims to describe the extent of herbal medicine use in children presenting for ambulatory surgery and anesthesia.

Methods

Institutional Ethics Board approval for the study was obtained. Six hundred and one children between the ages of 1 month and 16 years sequentially admitted for day-case surgery over a 10-week period were enrolled in the study. The child’s parent/guardian was asked to complete a questionnaire relating to the administration of herbal medicines to their child. The questionnaire was completed in the presence of a nurse who was available to answer any queries. Recorded demographics included the health insurance status of the child (as a surrogate marker of economic status) in addition to age and gender. The questionnaire included a tick box list of commonly used herbal medicines listed by their generic names. Proprietary names were not listed, but a space was allowed for parents to include any product that they had given to their child which may have contained a herbal medicine. If the child was aged 6 months or less the parent was asked whether they were breastfeeding, and if so, whether they were concurrently taking an herbal preparation.

Results

Six hundred and one children were enrolled over an 8-week period. No parent declined participation. Of the 601 respondents, 39 (6.4%) children were currently taking an herbal preparation; while a further 61 (10.1%) had taken an herbal medicine in the past. Nine of these children were under 1 year of age. One breastfeeding mother was aged taking St John’s wort. Echinacea was the most frequently administered preparation followed by arnica. Others included St John’s wort, ginkgo, valerian and ginseng (Table 1).

The majority of parents had not informed their family practitioner that the child was taking this medicine (84.7%). An even greater number had not informed the surgical team admitting the child that day (89.8%). Children were administered herbal medicines based on information obtained from family friends (23.9%), media (18.1%), alternative practitioners (10.1%), general practitioners (GP) (5.7%), pharmacy (5.7%), religious instruction (3.6%) and the internet (2.1%).

Eighteen percent of children had private health insurance; of these 34.2% were taking an herbal medicine compared with 15.4% of uninsured children ($\chi^2 = 19.389; P < 0.001$).

Discussion

An herbal medicine may be defined as a plant-derived product used for the purpose of health benefit (7). The use of such therapies appears to be increasing (8), with 20% of English adults (9) and up to 37% of Americans using herbal medicines in any calendar year (10). Studies carried out on adult surgical populations suggest that 22–43% are taking herbal medicines in the perioperative period (1,11). Approximately 29% of Australian children with asthma, and 14% of American adolescents with inflammatory bowel disease use herbal medicines for treating their condition (12). In Washington, a prevalence study showed that 8.4% of children used herbal remedies, while the figure were almost 5% in a similar primary care pediatric setting in Detroit (13,14). However, no such data was available for a pediatric surgical population. Our study has identified that 16.6% of children admitted for day-case surgery were currently taking or had taken an herbal medicine in the past.

Table 1

<table>
<thead>
<tr>
<th>Herbal medicine (HM)</th>
<th>% patients (n = 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Echinacea</td>
<td>35</td>
</tr>
<tr>
<td>Arnica</td>
<td>31</td>
</tr>
<tr>
<td>Camomile</td>
<td>11</td>
</tr>
<tr>
<td>St Johns wort</td>
<td>7</td>
</tr>
<tr>
<td>Garlic</td>
<td>4</td>
</tr>
<tr>
<td>Valerian</td>
<td>3</td>
</tr>
<tr>
<td>Ginkgo</td>
<td>3</td>
</tr>
<tr>
<td>Ginseng</td>
<td>2</td>
</tr>
<tr>
<td>Unknown type</td>
<td>12</td>
</tr>
<tr>
<td>Multiple HMs</td>
<td>8</td>
</tr>
</tbody>
</table>
In this study, 16% of those taking an herbal medicine were ingesting substances which may impact upon perioperative care. A further 12% of parents admitted to administering an herbal product to their child, but had no idea what it was. Increased bleeding has been reported with the use of gingko and garlic, hypertension with ginseng, and excess sedation with St John’s wort, all of which are pertinent to anesthesia and surgery (2,15).

In vitro studies indicate that garlic can inhibit platelet aggregation (16), and several case reports suggest that it may cause an increased bleeding tendency. These events, while anecdotal have had serious consequences for some patients, including a spontaneous epidural hematoma and increased perioperative bleeding (17–19). Gingko biloba, which may have beneficial effects on memory and concentration, also has antplatelet and anti-inflammatory activity. Several case reports of intracranial hemorrhage and surgical bleeding have been reported in patients taking gingko (20,21). It has been suggested that gingko be avoided in patients taking NSAIDs (22).

Both St John’s wort and valerian may potentiate or prolong the action of anesthetic agents, probably through the modulation of GABA neurotransmission (2,3). One case report documented a 90-min recovery time (to rousability) following a 10-min general anesthetic in a healthy young woman; the delay in recovery possibly being attributable to St John’s wort (3). Ginseng has been reported as having hypoglycemic effects in patients with type-II diabetes (23). The two children taking ginseng in our study were aged 2 and 4 years; so perioperative hypoglycemia was not a particular concern in these patients. However, the hypoglycemic effects of ginseng may be more pertinent in younger infants.

There have been no reports of drug interactions between anesthetic medications and the two most commonly taken herbal medicines, echinacea and arnica. Echinacea is commonly used for the prevention and treatment of viral, bacterial and fungal infections, particularly those affecting the upper respiratory tract. Current evidence suggests that while it may reduce the duration and severity of a respiratory tract infection, it is not effective as prophylaxis (15). However, long-term echinacea use may result in immunosuppression, which may potentially increase the risk of wound infection (24).

Homeopathic arnica is widely believed to control bruising, reduce swelling and promote recovery after local trauma and many patients therefore take it perioperatively. Its efficacy is debated with trials giving both positive and negative results (25,26).

A recent systematic review of adverse effects of unconventional medicines in children identified 26 case reports and series where serious illness may have resulted from the administration of such unconventional therapies (27). This included a case of toxic hepatitis induced by valerian ingestion. In a recent report, the WHO Monitoring Centre included 8985 case reports of adverse events associated with herbal remedies between 1968 and 1997. Approximately, 100 of these events occurred in children under 10 years of age (28).

Most parents had obtained information on herbal medicines from nonmedical sources and had not informed medical staff involved in the care of their child of herbal medicine use. This appears to be quite common. Kaye et al. found that 70% of patients taking herbal medicines did not report this during routine preoperative assessment (11). Furthermore, a study by Ottolini et al. suggested that while 86% of children who used complementary or alternative medicine would like to talk to their pediatrician about such therapies, only 36% actually did so (13). This reticence renders it impossible to prepare for any potential side-effects or interactions, or to offer advice on their safe use in the perioperative period. This may include discontinuing herbal medicines prior to surgery.

The American Society for Anesthesiologists has recommended the discontinuation of all herbal medicines 2 weeks prior to surgery (29), while Ang-Lee has proposed recommendations based on current knowledge of the pharmacokinetics of the active metabolites of these substances. He suggests discontinuing kava and ephedra 24 h before, gingko more than 36 h before, St Johns wort more than 5 days before, and garlic more than a week before elective surgery.

Ernst recently surveyed 23 systematic reviews of trials of herbal medicines, concluding that 11 yielded a positive conclusion, nine positive but unconvincing results and three a negative outcome (30). The same author, in an editorial, suggested that adverse events may occur less frequently with herbal than conventional medicines, and that their use may be
beneficial in cost terms (31). What is apparent is that herbal medicines are here to stay. Survey data suggests that annual expenditure on herbal medicines may be as much as £240 million in the UK, and £1.3 billion in Germany (31,32). It is thus incumbent upon anesthetists to educate themselves about herbal medicines, including their benefits and risks. It is also essential that questions regarding alternative medical therapies are included during patient evaluation at GP and surgical clinics, and during anesthetic preoperative visits, in order to optimize perioperative care.

In conclusion, this study identified that approximately one-sixth of children attending for day-case surgical procedures had a history of current or previous ingestion of an herbal remedy. This information was not volunteered without direct questioning in the vast majority of cases. It is imperative that anesthetists caring for children are aware of all medications, both conventional and alternative, that a child is taking in order to provide the best possible level of care.

References

29. Available at: http://www.asahq.org/Newsletters/2000/02/00/herbal0200.html.

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