The Safety of Conscious Sedation in Peritonsillar Abscess Drainage

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Objective: To demonstrate the safety of conscious sedation in draining peritonsillar abscesses (PTAs).

Design: Children diagnosed as having a PTA in the pediatric emergency department were identified, and their medical records were retrospectively reviewed. Results of the present study were compared with those of a previous report.

Setting: A tertiary referral children's hospital pediatric emergency department.

Participants: Ninety-one consecutive children initially evaluated in the emergency department and managed for a PTA.

Interventions: Peritonsillar abscess incision and drainage with or without sedation. A team of physicians whose activities were documented on a formal conscious-sedation record was present. Patients were monitored for major and minor complications.

Outcome Measures: The primary outcome measures were major and minor complications. Secondary outcome measures were recurrence of PTA and the need for admission.

Results: There were 62 episodes of conscious sedation for drainage of a PTA. Among the 91 patients, 3 had a recurrence and 24 were admitted after the procedure. A previous study evaluated 30 episodes of conscious sedation for drainage of a PTA. No major complications occurred in either series. Combining the previous data with the present data produced 92 episodes of conscious sedation for drainage of a PTA. The 1-sided upper 95% confidence limit for the rate of major complications is 3.2%.

Conclusion: Our series, when combined with previously published data, demonstrates that conscious sedation can be safely used when draining a PTA in pediatric patients.


Management of a peritonsillar abscess (PTA) in the pediatric emergency department is a common consultation seen by the otolaryngologist. Management options include admission for intravenous antibiotic therapy, needle aspiration with or without incision and drainage, or immediate (quinsy) tonsillectomy. Transoral incision and drainage has been an accepted approach to managing PTAs. The efficacy of transoral incision and drainage to treat PTAs in children has been documented, as has the safety and efficacy of managing these children in the outpatient setting. Unfortunately, transoral incision and drainage is not tolerated well by children and traditionally requires restraint, creating a frightening and painful experience for the child and the parent. The risks of transoral incision and drainage of PTAs in children include vascular, neural, and soft tissue injury. There is also a significant risk of aspiration of purulence in a restrained, combative child.

Conscious sedation is defined as a medically controlled state of depressed consciousness that allows maintenance of protective reflexes, the ability to maintain a patent airway, and appropriate response by the patient to physical stimulation or verbal command. The goal of sedation is to guard the patient's safety and welfare, while reducing his or her pain and psychological stress. Sedation represents a continuum between full alertness and general anesthesia, which may result in the loss of the patient's protective reflexes. Conscious sedation has been increasingly used in the pediatric population for invasive procedures in the outpatient setting. The efficacy and safety of intravenous midazolam hydrochloride and ket-
PATIENTS AND METHODS

Children diagnosed as having a PTA in the pediatric emergency department of a tertiary referral children’s hospital (St Louis Children’s Hospital, St Louis, Mo) from March 1, 1998, until March 31, 2001, were identified through medical records (International Classification of Diseases, Ninth Revision, Clinical Modification code 475). Records were reviewed retrospectively for the patient’s age, sex, symptom duration, type of treatment, findings of the procedure, sedation complications, and need for hospitalization. The Washington University School of Medicine (St Louis) Human Studies Committee approved the study.

A team of physicians managed patients who underwent PTA incision and drainage under conscious sedation. The team included an otolaryngologist who performed the drainage procedure, a pediatric emergency medicine physician trained in the administration of conscious sedation, and a registered nurse who monitored and documented vital signs and sedation level. The activities of this team were documented by the registered nurse on a formal conscious-sedation record.

As part of the conscious-sedation regimen, each patient has intravenous access and is taken to a procedure room that has airway stabilization and advanced cardiac life support equipment readily available. Midazolam and ketamine are the agents most commonly used for sedation, and glycopyrrolate is frequently given to decrease oral secretions. During sedation, heart rate and rhythm, oxygenation, airway patency, blood pressure, and level of consciousness are continuously monitored and documented at least every 5 minutes. The patient continues to be closely monitored until he or she achieves criteria for discharge, which include being awake, verbalizing, and walking with minimal help.

The primary outcome measures were major and minor complications from conscious sedation. Major complications included endotracheal intubation or other assisted ventilation, administration of naloxone hydrochloride for reversal of sedation, significant bleeding, and aspiration. Minor complications included oxygen saturation below 90% that either corrected spontaneously or responded to noninvasive techniques (verbal reminders, chin lift, jaw thrust, or supplemental oxygen) and nausea and vomiting.9,9

Secondary outcome measures that were considered were recurrence of PTA and the need for hospital admission. Recurrence was defined as presentation for a second PTA within 1 month of the original procedure.9

Outcomes of patients who were managed with conscious sedation were compared with previously published data from our institution9 on the complications from PTA incision and drainage under conscious sedation.

Descriptive statistics, such as frequency counts, means, medians, and ranges, were used to describe baseline characteristics of the sample and historical populations.

RESULTS

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Conscious Sedation</th>
<th>No Sedation</th>
<th>Surgery</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of patients</td>
<td>60</td>
<td>28</td>
<td>3</td>
<td>91</td>
</tr>
<tr>
<td>Age, y</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤10</td>
<td>24</td>
<td>2</td>
<td>3</td>
<td>29</td>
</tr>
<tr>
<td>&gt;10</td>
<td>36</td>
<td>26</td>
<td>0</td>
<td>62</td>
</tr>
<tr>
<td>Mean</td>
<td>12.1</td>
<td>15.9</td>
<td>5.8</td>
<td>13.0</td>
</tr>
<tr>
<td>Median</td>
<td>13</td>
<td>16</td>
<td>8</td>
<td>14</td>
</tr>
<tr>
<td>Range</td>
<td>2-20</td>
<td>10-20</td>
<td>2-6</td>
<td>2-20</td>
</tr>
<tr>
<td>I&amp;D performed</td>
<td>62</td>
<td>28</td>
<td>NA</td>
<td>90</td>
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<tr>
<td>Major complication</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Minor complication</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>PTA recurrence</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Hospital admission</td>
<td>19</td>
<td>2</td>
<td>3</td>
<td>24</td>
</tr>
</tbody>
</table>

PTA indicates peritonsillar abscess; I&D, incision and drainage; and NA, not applicable.

Ninety-one patients underwent treatment of a PTA during the 36 months of the review. Their demographic data appear in Table 1. Sixty patients underwent incision and drainage under conscious sedation, 28 underwent incision and drainage without sedation, and 3 were taken to the operating room for immediate tonsillectomy. The choice of sedation, no sedation, or immediate tonsillectomy was dependent on several variables. These included surgeon’s preference, patient’s age, and severity of illness.

Three patients had a recurrence of their PTA. The first was a 16-year-old who underwent initial incision and drainage without conscious sedation and returned 3 days later for a second incision and drainage under conscious sedation. Two patients (both aged 15) underwent initial incision and drainage under conscious sedation; one returned 2 days later and the other 3 days later for a second incision and drainage under conscious sedation. The patient who returned 3 days later had received no antibiotics after the initial procedure, because of medical noncompliance. A fourth patient aged 10 years underwent initial incision and drainage under conscious sedation, returned 4 months later, and because of the history of a prior PTA underwent immediate tonsillectomy.

Table 1. Clinical Characteristics of Patients Treated for PTA Drainage (Present Study)*
In the present study, there were no major complications and 3 minor complications (1 in the conscious-sedation group and 2 in the nonsedation group). The minor complication in the conscious-sedation group involved a 15-year-old who had a transient oxygen desaturation to 89%, which resolved immediately after verbal arousal. The 2 complications in the nonsedation group involved 2 patients, aged 13 and 17, who were both given small doses of a narcotic (morphine sulfate and meperidine hydrochloride, respectively) and subsequently developed nausea and vomiting.

Nineteen patients from the conscious-sedation group and 2 from the nonsedation group were admitted to the hospital after the procedure. The indications for admission of these patients are outlined in Table 2. The primary reason for admission was dehydration. No patient was admitted secondary to problems with the sedation. The time required until discharge or admission after the procedure ranged from 30 to 150 minutes.

A previous report described 27 patients who underwent conscious sedation and 25 who did not receive sedation. No major complications and 1 minor complication were reported in that series. The minor complication involved a 4-year-old who, during conscious sedation, had a temporary oxygen desaturation to 88%, which immediately resolved with stimulation and a shoulder roll. Table 3 contains the previously published demographic data for this patient population.

Combining these previous data with the patients from the present study, we obtained 92 episodes of conscious sedation for drainage of a PTA. The 1-sided upper 95% confidence limit for the rate of major complications is 3.2%.10

**COMMENT**

Incision and drainage of a PTA in the pediatric population under conscious sedation is safe. In 2 combined studies, there were no major and 4 minor complications. Two of these occurred in patients with conscious sedation and 2 without conscious sedation. Both minor complications in patients with sedation involved a brief episode of decreased oxygen saturation that responded promptly to verbal stimulation. Our institution uses a formal protocol that has been established for conscious-sedation reporting. Although this is a retrospective review, it is unlikely that the most minor of negative symptoms would not be reported on this document. It is possible, however, that perceived benign intervention, such as verbal reminders, may have occurred with greater frequency than was reported. Irrespective, there were no major complications related to either the conscious sedation or the actual drainage procedure.

How certain are we that conscious sedation is a safe procedure for the drainage of a PTA? In our small series of patients, the frequency of major complications was 0%. Therefore, only 1-sided confidence limits can be determined. Rumke showed that the certainty with which a particular effect can be assumed to be present or absent was dependent on the total number of observations in the series. We arbitrarily chose a 95% confidence limit for the rate of major complications in our study. By applying Rumke's rule to our series of patients, we know that the probability of a major complication occurring is between 0% and 3.2%. Some observers of this series may not accept the upper limit of 3.2% as an acceptable rate of complications; this is a valid argument. However, we would predict that as our experience increases our rate of complications would decrease.

In our review, 2 minor complications occurred in the group that did not receive sedation. These were both related to the attempted use of small doses of narcotics instead of using a formal sedation protocol. In neither series of patients is there a major complication directly related to the incision and drainage procedure. Complications from transoral incision and drainage of a PTA may include bleeding; failure to fully evacuate the abscess; leading to a recurrence; and pulmonary aspiration of the abscess.

**Table 2. Indications for Admission**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Conscious Sedation</th>
<th>No Sedation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, y</td>
<td>2</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>&lt;10</td>
<td>15</td>
<td>5</td>
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</tr>
<tr>
<td>&gt;10</td>
<td>25</td>
<td>20</td>
<td>45</td>
</tr>
<tr>
<td>Mean</td>
<td>10.8</td>
<td>13</td>
<td>11.2</td>
</tr>
<tr>
<td>I&amp;D performed</td>
<td>30</td>
<td>25</td>
<td>55</td>
</tr>
<tr>
<td>Major complication</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Minor complication</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>PTA recurrence</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Hospital admission</td>
<td>3</td>
<td>6</td>
<td>9</td>
</tr>
</tbody>
</table>

*OSA indicates obstructive sleep apnea.

**Table 3. Clinical Characteristics of Patients Treated for PTA Drainage (Previously Published Data)*

*PTA indicates peritonsillar abscess; I&D, incision and drainage.
scess contents. There are several reports in the literature on the recurrence rate after needle aspiration or incision and drainage of a PTA. We could find no reports of bleeding complications or pulmonary aspiration after incision and drainage; nonetheless, they remain potential risks of this transoral procedure. In the combined series of patients, there were 145 drainage procedures, with 6 recurrences, for an overall recurrence rate of 4.1%. This recurrence rate is well within the 10% rate of recurrence cited in the literature. There were no episodes of significant bleeding or pulmonary aspiration documented in these cases.

Historically and now, pediatric patients have received poorer pain control in the emergency department setting than adult patients. The reluctance to provide analgesia for pediatric patients is often related to fears of respiratory depression. Studies on conscious sedation have reported the adverse events and complications. Adverse events have included oxygen desaturation, apnea, stridor, laryngospasm, bronchospasm, cardiovascular instability, paradoxical reactions, aspiration, and emesis. Complications are defined as adverse events that negatively affect outcome or delay recovery. The adverse event rate in a recent report from a large tertiary pediatric emergency department for conscious sedation performed by pediatric emergency-trained physicians on 1180 patients was 2.3%, and no serious complications occurred.

As experience is gained in the administration of pediatric conscious sedation for other invasive and therapeutic procedures, consideration should be given to its use in the management of PTAs. Pediatric patients who need incision and drainage of a PTA provide an optimal situation in which conscious sedation can improve the care of the patient. In the management of a PTA, conscious sedation properly administered provides a cooperative patient whose airway protective reflexes are intact.

Sedation represents a continuum from fully alert to general anesthesia, and as the level of sedation deepens, the patient may lose his or her airway protective reflexes. This has led to the institution of strict guidelines for the monitoring and management of pediatric patients during and after conscious sedation. We have shown that conscious sedation, when administered by trained personnel, is a safe means of managing a PTA in pediatric patients. Conscious sedation, however, remains a specialized undertaking that requires the presence of appropriate emergency department physicians and nursing staff trained in its administration in the pediatric setting. The vigilant monitoring and specialized training required may limit the safe use of this technique. However, in facilities in which pediatric conscious sedation is undertaken for other procedures, it would be appropriate to consider its use in the management of PTAs.

In our series, the number of patients requiring hospital admission after drainage of a PTA was higher in the group receiving conscious sedation. Inherent bias in the selection of patients receiving conscious sedation over those who do not receive sedation most likely accounts for this difference. Patients who are perceived as having a larger PTA, appear more ill, or have a greater degree of trismus may be selected for conscious sedation to maximize the drainage of the PTA. Also, patients who are younger are less likely to tolerate the procedure without the assistance of conscious sedation. The severity of the illness and the age of the patient may have led to the increased incidence of admission seen in our patient population who underwent conscious sedation.

Our series, when combined with previously published data, demonstrates that conscious sedation can be safely used when draining a PTA in pediatric patients. In institutions in which trained emergency personnel now administer pediatric conscious sedation, we recommend consideration of its use in the management of PTAs.

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