

Ultrasound-Guided Drainage of Peritonsillar Abscess by the Emergency Physician

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The diagnosis of peritonsillar abscess (PTA) poses a challenge to emergency physicians (EPs). The decision to perform an invasive procedure with potential complications is based on clinical judgment that is often inaccurate. Although there is some mention of intraoral ultrasound in otolaryngology practice, there is none in the emergency medicine (EM) literature. However, this bedside emergency application of ultrasonography has the potential to be of considerable use in EM practice, and could allow EPs who previously deferred blind needle aspiration of a potential abscess to perform the procedure themselves. We report the cases of 6 patients who presented with probable PTA and were evaluated with intraoral ultrasound at the bedside by an EP. All 6 patients then underwent needle aspiration. As diagnosed on ultrasound, 3 of the patients had negative aspirations and were diagnosed with peritonsillar cellulitis. Three others were found to have PTA, with 2 requiring real-time ultrasound needle guidance to accomplish abscess drainage after multiple failures with the blind approach. (*Am J Emerg Med* 2003;21:155-158. Copyright 2003, Elsevier Science (USA). All rights reserved.)

Management of a peritonsillar abscess (PTA) can be challenging for the emergency physician (EP). Clinically, the diagnosis is presumed on the basis of a distorted anatomy of the uvula and peritonsillar area. However, a small case series by experienced specialists suggests that the clinical impression in PTA is unreliable, with sensitivities ranging near 78%.¹ Peritonsillar cellulitis can appear very similar to PTA, with significant erythema and bulging of the peritonsillar area. In addition, blind needle aspiration, the typical method of diagnosis of PTA, has a reported false-negative rate of 10 to 12%.² However, this reported rate is for otolaryngologists, and for physicians who do not regularly perform the procedure the false-negative rate may be even higher.

Ideally EPs would be able to obtain an imaging study to verify the presence of an abscess and to then either further

use the imaging modality to guide the needle into the abscess in real-time, or to have the best route mapped, as in paracentesis following ultrasound marking. Although computed tomography (CT) and magnetic resonance imaging (MRI) are nearly 100% sensitive in the diagnosis of PTA, they are expensive and hardly lend themselves to either guided needle drainage or marking the best approach for a blind attempt at drainage.¹

One of the greatest perceived dangers with blind needle aspiration of a PTA is potential injury to the carotid artery. Although we could find no published reports of this in the English literature, it is at least common lore that injury and severe disability can and has occurred. This probably keeps many EPs from performing needle aspirations of potential PTAs.

Attempts at using ultrasound as a diagnostic adjunct in evaluating PTAs have included the use of high-resolution probes to image through the neck externally, as well as intraoral probe placement. Although most studies involve small numbers of subjects, intraoral ultrasound (IOU) has been reported to have a sensitivity of 89 to 92% and a specificity of 80 to 100%.^{3,4} No examples of the use by EPs of IOU to diagnose PTA could be found in the emergency medicine literature. Further, there were no examples of real-time, ultrasound-guided needle drainage of a PTA in any of the literature we searched.

CASE 1

N.G. is a 24-year-old woman with no past medical history who presented to our emergency department (ED) with the complaints of a sore throat and fever of 3 days duration. She also noted difficulty in opening her mouth completely in the 2 days preceding her visit. The patient's temperature was 101.4°F, blood pressure 113/73 mmHg, heart rate 92 beats/minute, and respiratory rate 16 breaths/minute. On physical examination the patient was able to partly open her mouth. She had an erythematous pharynx with a brightly erythematous, bulging right peritonsillar mass and shift of her uvula. The rest of her physical examination was benign except for right anterior cervical lymphadenopathy.

The patient was given intramuscular ketorolac to ease her discomfort and improve her mouth opening. The back of her throat was then sprayed with a topical anesthetic, and a covered endocavity transducer was placed into her mouth (Fig 1). A scan of the right peritonsillar area revealed a

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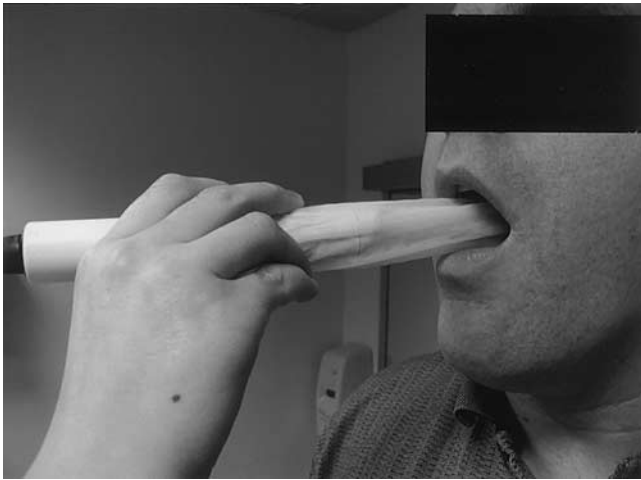


FIGURE 1. Placement of endocavity probe shown intraorally for evaluation of a PTA.

small abscess that was clear of the carotid artery. The patient was then given antibiotics, and the treating EP consulted an otolaryngologist for abscess drainage. After several blind needle drainage attempts, the consultant removed approximately 2 mL of pus and the patient was admitted for further treatment. The patient was discharged after 2 days and recovered without complications.

CASE 2

H.S. is a 32-year-old man with no significant past medical history who presented to the ED with a sore throat and cough of 4 days duration. Two days before his visit he began to have difficulty swallowing, and now had pain on opening his mouth. The patient's temperature was 102.3°F, blood pressure 142/84 mmHg, heart rate 81 beats/minute, and respiratory rate 14 breaths/minute. On physical examination the patient was able to only partly open his mouth. His posterior pharynx was erythematous and had multiple areas of pus on both tonsils. The left peritonsillar area was bulging, with a shift of the uvula. The remainder of the physical examination was unremarkable except for focal wheezes in the right lower lobe and left anterior cervical lymphadenopathy.

The patient was given an intramuscular injection of ketorolac, which partly relieved his discomfort. A chest radiograph ordered by the treating EP was normal. The patient's throat was sprayed with a topical anesthetic and a covered endocavity probe was placed in his mouth. Long- and short-axis scans of his left tonsil revealed no abscess. The treating EP consulted an otolaryngologist, who made several unsuccessful attempts at blind aspiration. The patient was given intravenous antibiotics and admitted for observation with a diagnosis of peritonsillar cellulitis. He was discharged from the hospital the next day, and recovered without complications.

CASE 3

J.W. is an 18-year-old woman with no past medical history who presented to the ED with complaints of fever,

sore throat, and cough for the previous 5 days. She noted that her neck now seemed swollen on the right side and that she had difficulty with swallowing and opening her mouth. Her temperature was 103.4°F, heart rate 87 beats/minute, respiratory rate 12 breaths/minute, and blood pressure 120/72 mm Hg. On physical examination her posterior pharynx was found to be erythematous, with multiple areas of pus on both tonsils. The left peritonsillar area was bulging and had greater erythema than the right peritonsillar area. The remainder of the physical examination was unremarkable except for bilateral anterior lymphadenopathy.

The patient's throat was sprayed with a topical anesthetic and an endocavity probe was inserted into her mouth to scan the left tonsillar area. The ultrasound examination revealed no abscess. The patient was then seen by an otolaryngologist consulted by the treating EP. Three blind attempts at aspiration were made without aspiration of pus. The patient was given the diagnosis of peritonsillar cellulitis and treated with intravenous antibiotics. She was discharged to her home with oral antibiotics and instructions for follow-up evaluation. She recovered without complications.

CASE 4

N.H. is a 53-year-old man with a history of medically controlled hypertension who presented to the ED with complaints of throat pain, cough, and fever lasting for 3 days. His throat pain was worsening and he could consume only liquids because of difficulty in opening his mouth. The patient's temperature was 101.9°F, his heart rate 95 beats/minute, blood pressure 156/90 mm Hg, and respiratory rate 16 breaths/minute. On physical examination he was found to have right anterior cervical lymphadenopathy. His posterior pharynx was erythematous with enlarged tonsils bilaterally. His right peritonsillar area was bulging. The remainder of the patient's physical examination was unremarkable. His throat was sprayed with a topical anesthetic and an endocavity transducer was inserted (Fig 1).

A scan of the patient's right peritonsillar area showed an abscess that was well away from the internal carotid artery (Fig 2). The treating EP attempted multiple blind needle aspirations but was unsuccessful. The transducer was reinserted into the patient's mouth and the probe operator guided the aspiration syringe and needle to the core of the

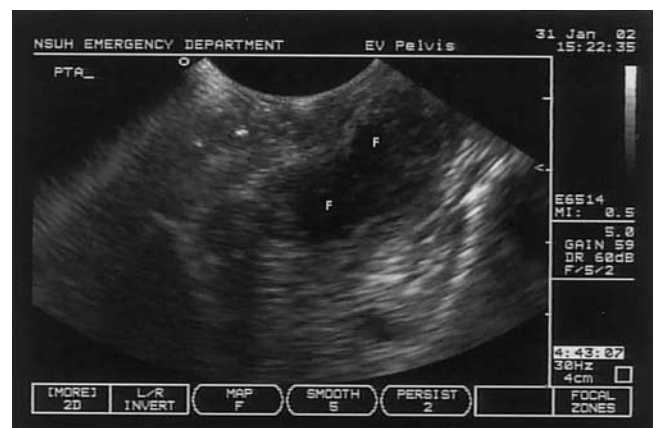


FIGURE 2. PTA, with fluid marked by "F".



FIGURE 3. The needle is shown penetrating into an abscess, as denoted by arrows (C).

patient's abscess in real time (Fig 3). The abscess was observed to shrink as approximately 10 mL of pus was aspirated (Fig 4). The patient was given intravenous antibiotics and was admitted to the hospital. He was discharged after 2 days and went on to recover without complications.

CASE 5

J.L. is a 43-year-old woman with no past medical history who presented to the ED with the complaint of a sore throat lasting for 1 week, and now had increased pain on the left side of her throat. The patient denied having a fever, and had no trouble opening her mouth. The patient's temperature was 100.0°F; her heart rate was 83 beats/minute, blood pressure 126/74 mm Hg, and respiratory rate 14 breaths/minute. Physical examination showed her to have left anterior cervical lymphadenopathy. Her posterior pharynx was erythematous, with a brightly erythematous left tonsillar pillar and tonsil. The remainder of the patient's physical examination was unremarkable. Her throat was sprayed with a topical anesthetic and an endocavity transducer was inserted.

On the basis of the patient's physical examination, peritonsillar cellulitis was suspected, rather than an abscess. However, on initial scan of the left tonsil, a 1-cm-diameter fluid collection was noted. Blind aspiration was attempted by the EP but failed. The aspiration was then repeated under ultrasound guidance, and 5 mL of pus were successfully removed. The patient was given intravenous antibiotics in the ED and sent home with oral antibiotics. At a 2-week follow-up examination all of her symptoms had resolved and she had no complaints.

CASE 6

E.M. is a 21-year-old man with no past medical history who presented to the ED complaining of a sore throat, fever, headache, and difficulty in swallowing of 4 days duration. He noted pain on the right side of his neck, and had difficulty eating. The patient was febrile, with a temperature 102.3°F, heart rate of 97 beats/minute, respiratory rate of 16 breaths/minute, and blood pressure of 135/75 mm Hg. On physical examination his posterior pharynx was found to be

erythematous. The right tonsil was swollen, with deviation of the uvula to the left. The remainder of the physical examination was remarkable for anterior cervical adenopathy.

Intravenous ketorolac and a topical anesthetic were administered to ease the patient's discomfort. A covered endocavity probe was then placed into the posterior pharynx, and long- and short-axis scans revealed prominent lymphatic tissue without fluid collection. The patient was then seen by an otolaryngologist consulted by the treating EP. Several blind attempts at aspiration were performed without aspiration of pus. The patient was diagnosed as having peritonsillar cellulitis, given intravenous antibiotics, and discharged to his home with oral antibiotics. The patient recovered without any complications.

DISCUSSION

The diagnosis of PTA poses both diagnostic and therapeutic challenges for the EP. Clinical appearance alone can be an unreliable basis for making the diagnosis. This is exemplified by two of the cases described above, in which one of us, as the EP (M.B.), was absolutely certain of finding a PTA, whereas the final diagnosis was peritonsillar cellulitis. Currently, the diagnosis of PTA relies on needle aspiration, a procedure that may not be regularly practiced by EPs and has the potential for severe, if rare, complications. However, lack of prompt diagnosis and treatment of PTA can result in poor outcomes. As reported in the literature, cases of caudal spread of infection resulting in mediastinitis, septic shock, and pericardial tamponade, as well as erosion into the carotid artery, are rare but disastrous consequences.^{5,6}

Needle aspiration has become a method for both diagnosis and treatment of this disease, even though the procedure may give false-negative results even in experienced hands.² In EM practice there is some reluctance to using this procedure, since it is blind and carries rare yet serious complications, such as puncturing of the carotid arteries, jugular veins, or parotid gland.¹ In addition, one third of abscesses occur in the mid- to inferior pole of the tonsil, a region where many EM practitioners may be reluctant to aggres-

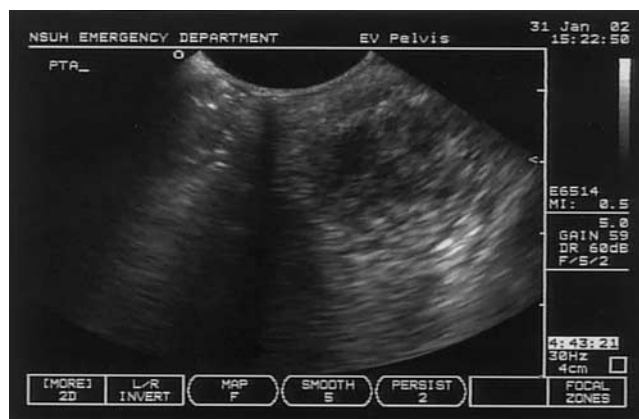


FIGURE 4. Area of abscess shown after drainage of pus. The abscess cavity was seen to shrink in real time as pus was withdrawn.

sively search for purulent accumulations.¹ Although other imaging modalities such as CT or MRI offer sensitive and specific alternatives, they are costly and lead to inefficient practices and longer waiting times, and therefore to potentially dissatisfied patients, especially if blind needle aspiration is not immediately successful.

IOU is a quick, inexpensive diagnostic and therapeutic tool.^{7,8} The components needed for this are common parts of most emergency ultrasound systems, since pelvic ultrasonography is one of the most common procedures performed by EPs. The endocavity probe required for endovaginal examinations is ideal for IOU. It is covered with either a glove or condom and placed into the oral cavity over the area in question (Fig 1). Premedication with ketorolac is often required because of trismus found commonly in these patients. For those few EPs fortunate enough to have a biopsy guide and needle on their endocavity probe, the needle insertion procedure will be made even simpler, since the needle will follow a prescribed path without deviation, therefore requiring less hand-to-eye coordination.

In our small case series, EPs were 100% sensitive and specific in the diagnosis and treatment of PTA. In fact, it quickly became clear to us that ultrasound was more accurate than blind needle aspiration even when the latter was performed by an experienced otolaryngologist. Although the case series reported here is severely limited by its small size, it suggests that IOU has a role in the diagnosis and treatment of PTA in the ED. Not only can EPs successfully

use it to diagnose PTA, but they can become more confident in their ability to perform a procedure they may not do regularly. In 2 of our cases the needle was guided in real time with visualization of important vascular structures; the pus collections in these cases were aspirated with successful drainage. The present report also appears to be the first report in the literature of drainage guided by direct visualization through the use of IOU.

REFERENCES

1. Scott PMJ, Loftus WK, Kew J, et al. Diagnosis of peritonsillar infections: a prospective study of ultrasound, computed tomography, and clinical diagnosis. *J Laryngol Otol* 1999; 113:229-232
2. Snow DG, Campbell JB, Morgan DW. The management of peritonsillar sepsis by needle aspiration. *Clin Otol*. 1991; 16:245-247
3. Strong EB, Woodward PJ, Johnson LP. Intraoral ultrasound evaluation of peritonsillar abscess. *Laryngoscope* 1995; 105:779-782
4. Buckley AR, Moss EH, Blokmanis A. Diagnosis of peritonsillar abscess: value of intraoral sonography. *AJR* 1994;162:961-964
5. Manecke GR, Marghoob S, Finzel KC, et al. Catastrophic caudad spread of a peritonsillar abscess: A case report. *Anesthesiology* 1999;91:1956-1958
6. Garino JP, Ryan TJ. Carotid hemorrhage: a complication of peritonsillar abscess. *Am J Emerg Med* 1987;5:220-223
7. Ahmed K, Jones AS, Shah K, Smethurst A. The role of ultrasound in the management of peritonsillar abscess. *J Laryngol Otol* 1994; 108:610-612
8. Haeggstrom A, Gustafsson O, Engquist S. Intraoral ultrasonography in the diagnosis of peritonsillar abscess. *Otolaryngol Head Neck Surg* 1993;108:243-247