

# Variation in patient presentation and the use of computer tomography in the urgent care diagnosis and treatment of peritonsillar abscess

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April 18, 2023

## Abstract

### Background

A peritonsillar abscess (PTA) is a collection of infectious material within the peritonsillar space, seen most often in teenagers and young adults. The diagnosis of a PTA is reliant on a patient's history and physical exam; however, CT scans continue to be used. The rationale for imaging in the diagnosis of a PTA may be better understood based on patient presenting symptoms and physical exam findings.

### Methods

A retrospective review of adult patients diagnosed with a peritonsillar abscess in an acute care/emergency setting at a tertiary hospital between January 1 to December 31, 2019, was performed. Patients were arranged into two groups: those who underwent a CT scan versus patients who did not scan as part of their clinical work-up. Patient demographics, and differences in the rate of subjective and objective findings were compared.

### Results

43 patients were included in the study: 19 in the CT scan group, and 23 in the no-CT scan group. There was no statistically significant difference in the history of previous peritonsillar abscess incidence, patient chief complaint at triage, subjective complaints, or objective physical exam findings. The most common patient reported symptoms in both groups were odynophagia and dysphagia. The most common objective findings in both groups included peritonsillar fullness and erythema, and uvular deviation.

### Conclusion

Patients who underwent a CT scan as part of their work-up for a peritonsillar abscess had no difference in symptoms or physical exam findings when compared to patients who did not have a CT scan.

### Key Points:

- The most common chief complaint in patients with a PTA is sore throat.
- Patients who underwent a CT scan as part of their work-up for a peritonsillar abscess had no difference in symptoms than those without a CT scan.
- Patients who underwent a CT scan as part of their work-up for a peritonsillar abscess had no difference in physical exam findings than those without a CT scan.
- Patients with odynophagia, dysphagia, peritonsillar fullness & erythema, and uvular deviation should be assessed for a peritonsillar abscess.
- The use of CT diagnostic imaging for the diagnosis of peritonsillar abscess should be judiciously weighed against the impact and time these investigations cost.

## Introduction

A peritonsillar abscess (PTA) is a common bacterial deep neck space infection which, historically, has been thought of as an evolution of an incompletely or poorly treated acute bacterial tonsillitis (1). A PTA forms within the peritonsillar space, a potential space located between the palatine tonsil, the superior pharyngeal constrictor muscle, and the lateral pharyngeal wall (1,2). The collection of purulent material within the peritonsillar space leads to medial displacement of the ipsilateral tonsil with concurrent displacement of the uvula to the contralateral side. Surrounding soft tissue inflammation often leads to spasm of the masseter muscle, leading to trismus or impaired mouth opening. Additionally, soft tissue edema and swelling within the oropharynx leads to significant dysphonia; classically, these symptoms of uvular deviation, trismus, and dysphonia, known as quinsy's triad, are pathognomonic for a PTA (1,2).

The overall incidence of a PTA is estimated to be 1 in 10,000, with a mild bias for adults between the ages of 20 and 40. There is no defined predilection for ethnicity, or gender. Successful treatment of a PTA, in the absence of life-threatening complications, often involves decompression of the abscess cavity followed by systemic antibiotic therapy (1-3). The classical triad of trismus, uvular deviation and dysphonia suggests that a peritonsillar abscess is largely a clinical diagnosis, meaning diagnostic imaging such as x-ray or computer tomography (CT) is not necessary to make a diagnosis; however, CT scans continue to be ordered in some Emergency Departments for patients with a PTA (4). The use of inappropriate CT scans on patients with suspected PTA can lead to inappropriate and excessive utilization of healthcare resources, occupy patient time, result in inappropriate exposure to ionizing radiation, and lead to overburdening of radiologist physicians through excessive diagnostic imaging.

While the utility of CT scans in diagnosing various types of deep neck space infections is unquestioned (5), the clinical rationale regarding the use of CT imaging in the diagnosis and treatment of a peritonsillar abscess remains unclear. The goal of this study was to assess the clinical history and physical examination findings of two groups of patients diagnosed with peritonsillar abscess, and to identify whether any differences in subjective and/or objective clinical findings could be identified to guide the role of CT imaging in the management of peritonsillar abscesses.

## Methods

A retrospective chart review of adult patients who presented to a tertiary-level hospital in Canada from January 1, 2019, to December 31, 2019, was performed. All patients who presented to the Emergency Department who received a chief complaint category of "neck swelling/pain", "sore throat" and "difficulty swallowing" were included in the initial screening. These patient charts were reviewed to determine those who were diagnosed with a peritonsillar abscess. Of those patients diagnosed with a peritonsillar abscess, two groups were created, those who underwent a CT scan of the neck, and those who did not.

General patient demographics such as age, gender, triage-assigned chief complaint, and history of previous peritonsillar abscess for both groups was collected. In addition, the frequency of patient complaints such as unilateral or bilateral throat pain, odynophagia, dysphonia, and constitutional symptoms (ie. fevers, chills), and physical exam findings for both groups were documented.

## Statistical Analysis

SPSS (version 28.0; SPSS, Chicago, IL, USA) was used for data analysis. For the purposes of comparison and statistical analysis, between-group differences were performed using Barnard's exact test on 2 x 2 contingency tables. Threshold for statistical significance was set at  $p < 0.05$ .

## Results

### Study Groups Patient Demographics

A total of 937 patients presented to hospital from January 1, 2019 to December 31, 2019 with a chief complaint of "neck swelling/pain" ( $n = 283$ ), "sore throat" ( $n = 472$ ), or "difficulty swallowing" ( $n = 182$ ). Of those patients, a total of 43 (4.6%) were diagnosed with a PTA by either clinical history and physical

exam alone, or with the adjunct of a CT scan, and therefore included in this study [Table 1]. Of those patients diagnosed with a PTA, 19 patients were included in the CT scan group, while 24 were in the no CT scan group. Mean patient age was 39 and 35, respectively. 63% of those in the CT scan group were male, while 79% of patients in the no CT scan group were male. There were no statistically significant differences between the groups regarding their chief complaint (neck pain/swelling, sore throat, or dysphagia), nor was there a statistically significant difference in the rate of previous PTAs between groups.

### *Differences in Subjective Complaints between Groups*

The rates of documented patient subjective symptoms in each patients' chart were calculated [Table 2]. There were no statistically significant differences between the groups regarding their subjective complaints. The most common subjective complaints in both groups were odynophagia and dysphagia.

### *Differences in Patient Physical Exam Findings*

The rates of objective physical exam findings between patient groups were calculated [Table 3]. There were no statistically significant differences between the groups regarding their objective findings. The most common physical exam findings in both groups were peritonsillar fullness, peritonsillar erythema, and uvular deviation.

### *Discussion*

The purpose of our study was to examine the utility of CT scans for the diagnosis of peritonsillar abscess; more specifically, we hoped to determine if there was there a clinical characteristic of a patient that led to a higher suspicion of pathology that would warrant CT investigation beyond what a history and physical examination could determine.

Our study, to our knowledge, is the first of its kind to compare two populations of patients with peritonsillar abscess whose only difference in management is a CT scan, to better understand if the symptoms and physical exam findings have any influence on the rate of CT scan performance. Taken together, we did not observe any difference in the rates of chief complaint, history of PTA, subjective, or objective data between groups [Tables 1-3].

While there are no consensus statements on the management of peritonsillar abscesses within specialist groups, recent evidence-based reviews call into question the use of a CT scan in uncomplicated peritonsillar abscesses. A 2012 evidence-based review on the management of peritonsillar abscesses by Powell and Wilson argued against the use of CT scans in peritonsillar abscesses (6). One concern raised in arguing for the use of CT scans when a PTA extends beyond the peritonsillar space and into the parapharyngeal space (7). A 2009 study performed by *Monobe et al* analyzed this concern and found that 90% of superior-type parapharyngeal space abscesses extending from a peritonsillar abscess patients could be drained trans-orally, whereas 58% of inferiorly based peritonsillar abscesses extending to the parapharyngeal space could be drained via a trans-oral approach (8). It may therefore be more suitable in clinically stable patients presenting with a PTA and concern of parapharyngeal extension to undergo an attempt at trans-oral drainage first before pursuing further imaging.

With the advent of bedside ultrasound in the assessment of abscesses in multiple locations of the body, including the head and neck, further analysis of Emergency Medicine abscess management outlined by a 2021 evidence-based review by *Menegas et al* argues for the use of clinical assessment and possible trans-oral versus trans-cervical ultrasound, and against the use of CT scans in the diagnosis of peritonsillar abscess (9). This, we argue, further calls into question the utility of a CT scan in this specific patient population.

While CT scans do have their utility in diagnosing deep neck space infections, we feel a strong argument has been made against their utility in PTA work-up and management, even in the concern for possible carotid artery injury during drainage (10). A final concern with their use pertains to delays in care, and the unnecessary cost and burden on the healthcare system. Out-of-pocket private CT scans of the neck, according to Canadian data, cost upwards of \$500, which does not include the time and remuneration for

the CT technologists and interpreting radiologist (11); moreover, this does not include the time and money spent on transporting patients to and from the radiology department, time utilized by nursing and allied health staff, and delays in contacting the otolaryngology service for a consultation. While not the purpose of our study, we do feel that the inappropriate use of CT scans in simple PTA diagnostic work-up may inappropriately delay care of the patient, lead to unnecessary radiation exposure, and increase demand on the health care system. Over-utilization of and increased reliance on diagnostic imaging as a replacement for sound clinical exam and judgement would, by extension, also lead to delays in patient access to necessary emergent imaging

### Conclusion

Our study showed no significant differences in the presenting chief complaint, clinical history or physical examination findings between patients who received a CT scan and patients who did not receive a CT scan during their emergency room evaluation for peritonsillar abscess at a tertiary healthcare centre. This calls into question the diagnostic value of CT scans in patients with a suspected PTA. We observed a common constellation of symptoms and physical exam findings, and therefore argue that a diagnosis of a PTA in patients with odynophagia, dysphagia, peritonsillar fullness and erythema, and uvular deviation should be considered first, and therefore treated as such first before considering diagnostic imaging. Surveys of Emergency Physicians and the rationale for CT scans may help to address and understand the argument for CT imaging in patients with a PTA.

### Limitations

Our study is largely limited by our small sample size and retrospective methodology; moreover, our study is largely reliant on documentation on the part of the Emergency Physician and consulting Otolaryngology Physicians, which may be limited or incomplete in some instances. Future prospective studies and standardized data collection tools may help to overcome some of these limitations.

## Appendix

### Patient Demographics

	CT Group	No CT Group	p-value
Patient count (n)	19	24	-
AGE (Mean)	39	35	-
Patient gender (% Male)	63%	79%	-
CC: NECK SWELLING/PAIN	21%	4%	0.1
CC: SORE THROAT	68%	88%	0.06
CC: DIFFICULTY SWALLOWING	11%	8%	0.84
History of PTA	11%	8%	0.72

**Table 1. Select patient demographics, triage chief complaint and history of PTA between groups.** CC: chief complaint.

### Differences in Subjective Complaints

Subjective complaint	CT Group	No CT Group	p-value
Unilateral throat pain	30%	25%	0.95
Bilateral throat pain	0%	8%	0.51
Odynophagia	100%	67%	0.05
Trismus	30%	42%	0.62
Dysphonia	20%	42%	0.34
Constitutional symptoms	20%	17%	0.91

Subjective complaint	CT Group	No CT Group	p-value
Dysphagia	60%	58%	0.99
Otalgia	10%	8%	0.98

**Table 2. Documented patient complaints determined through history between groups.**

*Differences in Patient Physical Exam Findings*

Objective findings	CT Group	No CT Group	p-value
Peritonsillar fullness	100%	75%	0.17
Fever	13%	0%	0.23
Trismus	25%	25%	1
Dysphonia	13%	8%	0.8
Peritonsillar erythema	75%	58%	0.56
Cervical lymphadenopathy	13%	0%	0.24
Uvular deviation	50%	75%	0.32
Peritonsillar fluctuance	0%	25%	0.17

**Table 3. Documented patient physical exam findings between groups.**

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