Pharyngeal mucosal space abscess. A special entity that merits special management: our experience in 106 cases.

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Abstract

Keypoints: * The presence of a pharyngeal mucosal space abscesses (PMA), being confined between the pharyngeal mucosa and the pharyngeal constrictor muscle, is considered rare. However, in our series represented 14,3% of deep neck infections (DNIs), suggesting that they may not be so rare as they are considered to be. * PMAs' symptoms and clinical findings are similar to those of other DNIs, but trismus and neck swelling seem to be significant lower in PMAs. * Imaging studies will set PMA diagnosis, while CT with contrast is the modality of choice. * PMAs seems to be less dangerous than their deep-seated counterparts, since its superficial location renders them amenable to spontaneous drainage, aspiration, incision and drainage intraorally obviating spread to deeper structures.

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- PMAs' symptoms and clinical findings are similar to those of other DNIs, but trismus and neck swelling seem to be significant lower in PMAs.
- Imaging studies will set PMA diagnosis, while CT with contrast is the modality of choice.
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Introduction

Deep Neck Infections (DNIs) represent a relatively common condition with potentially life-threatening consequences. The advent of antibiotics has led to improved infection outcomes; nevertheless, they have several drawbacks. Wide spectrum empirical iv-antibiotics are initiated until culture and sensitivities are reported,[1-3] even so, culture results can be erratic due to the sampling timing, since some patients are on empirical oral antibiotics before admission or IV-treatment starts prior to aspiration. Hence, the clinician should make a call about optimal treatment, timing, and surgical access if needed, based on clinical findings and information from imaging studies.

Sound knowledge of pertinent surgical anatomy is of paramount importance in order to access all involved neck spaces.[1,2] In particular, pharyngeal mucosal space (PMS) is the most superficial neck space, lying just deep to pharyngeal mucosa anteromedially to parapharyngeal space and directly anterior to the retropharyngeal space. Its clinical significance has recently been recognized through cross-sectional imaging studies.

Anatomically is defined between pharyngeal mucosa (superficially) and investing layer of deep cervical fascia (deep). The latter surrounds the pharyngeal constrictors. It extends from skull base to the lower cricoid border, involving naso-oro-hypopharynx. It is bordered superiorly by the superior constrictor muscle's aponeurosis where it merges with the middle layer of deep cervical fascia. PMS contains loose areolar tissue that facilitates deglutition, lymphoid tissue and minor salivary glands. Dense connective tissue is present only in its deep surface (deep cervical fascia).[4-7] Some studies suggest that peritonsillar space is virtually a part of PMS,[4-6]however more recent studies definite them as separate spaces.[7]

PMS pathology includes neoplasms, congenital and inflammatory lesions,[4-6] while there is a lack of literature on pharyngeal mucosal space abscesses (PMA).[6] The purpose of this study was to present our experience and highlight the clinical behavior of abscesses constrained in PMS.

Methods

All necessary approvals obtained and all participants' data handled according to University Hospital of Larissa scientific committee's regulations, Helsinki and HIPAA regulations.

A retrospective study of 743 consecutive DNIs treated over the period January 2011-December 2019 was conducted. STROBE guideline has been followed. Diagnosis was suspected by clinical history and findings and confirmed by imaging. Data of patients with abscess contained only for PMS, including demographics, clinical information, bacteriology and treatment were exported and analyzed. PMA cases with pus extension to peritonsillar or any other neck space were excluded. Means are reported with SDs. X^2 test was used for comparisons; $p<0.05$ was considered significant. Data analysis was performed with SPSS 20 software (IBM, Chicago, IL, USA).

Results

PMA diagnosis involved 106 adults (female/male ratio:21/85, mean age: 51±14.1 years). Associated co-morbidities included hypertension (n=22), dyslipidemia (n=20), heart disease (n=8), thyroid disease (n=8), diabetes mellitus (n=7), asthma (n=5), anemia (n=3), renal insufficiency (n=1) and rheumatoid arthritis (n=1); 8 had a history of tonsillectomy. CT-scan with contrast confirmed diagnosis.

PMAs patients' symptoms are summarized on Table 1. The most commonly reported symptoms were dysphagia, odynophagia and fever. The mean onset of symptoms was 3.2±1.7 days prior to admission. Trismus and neck swelling were significantly lower in PMAs compared to non-PMA DNIs ($p<0.01$); while dysphagia was significantly higher ($p<0.01$). No association with teeth was noted in PMAs.

Table 2 tabulates the summary of PMA patients' physical examination findings. One-sided lateral pharyngeal wall edema was invariable; pyriform sinus, vallecula, uvula, peritonsillar swelling and unilaterally enlarged tonsil were noticed in 40.57%, 27,36%, 27,36%, 26,42% and 17,92% of patients respectively; while nasopharyngeal edema and adenoiditis was found in 3 patients. Tenderness was noted in all patients during palpation of larynx. The most common laryngeal endoscopy finding was arytenoid oedema (19.81%); glottic and subglottic areas were spared. Neck swelling was present in 24,53% of patients.

Mean WBC count and CRP values upon admission were 14,5±5,11K/μL (reference range, 4-10,8K/μL) and 13,4±10,1 (reference range, 0-0,5mg/dL) respectively. Samples for microbiological analysis were obtained in 61 patients; the rest 45 samples were not processed due to insufficient purulent material. Cultures yielded 23 positive results (Table 3). All isolated bacteria species were aerobic; the commonest were *Streptococcus pyogenes* (52,2%) and *Staphylococcus aureus* (30,4%). Before admission, 37 patients were under antibiotics and 6 under steroids by their GPs.

In-hospital empirical therapy included IV ampicillin-sulbactam combined with metronidazole or clindamycin. Spontaneous drainage was noted in 52(49,1%) patients, transoral drainage under local anesthetic in 47(44,3%), and aspiration in 7(6,6%). The mean time ±SD until spontaneous drainage was 1.8±0.8 days from admission. No further surgical intervention was necessary and no major adverse event was noted in any patient, while the mean hospital stay was 4.2±1.8 days.

Discussion

We have found only one study (PubMed search) reporting four PMA cases.[6] However, in our series PMAs represented 14,3% of DNIs, suggesting that this entity is not uncommon, and in "real world" practice may be underdiagnosed or misdiagnosed as parapharyngeal abscesses. PMA is supposed to be mainly associated with pharyngeal mucosa's infections; while infections of the teeth, major salivary glands, or other foci lateral to pharyngeal constrictor can hardly result in PMA.[6] Our results support this, since none of our cases had odontogenic or salivary source of infection.

Symptoms of PMAs are similar to those of DNIs. Dysphagia was consistent symptom in all patients, with odynophagia and sore throat lagging behind. Skoulakis et al[6], did not report trismus and neck swelling in their cases. In our series, mild trismus noticed in 20,75% of patients; but this finding was significantly lower than other DNIs. Neck swelling, secondary to neck lymphadenitis, even though significantly lower than other DNIs, was recorded in 24,53%. The rest of PMA symptoms were not significant different from other DNIs. Fever was noted in half of our patients, whilst mean WBC and CRP values were raised.

Lateral pharyngeal wall edema was a constant physical examination finding in all cases, while in some of them edemas in other oropharyngeal parts coexisted. In 43(40,6%) patients with abscess extension to hypopharyngeal part of PMA, edema was extended to pyriform sinus; while in those where pus reached the most inferior part of PMS, arytenoid or aryepiglottic fold edema coexisted. No other findings from laryngeal endoscopy were recorded, while follow up of the 5 cases with epiglottic edema and the 2 cases with the true vocal cord edema revealed the presence of epiglottic retention cysts and Reinke edema respectively. Tenderness during palpation of larynx (bilateral movement) was also a constant finding in all patients. Similar findings were reported by Skoulakis, et al.[6]

CT-scan with contrast (figure 1) is the "gold standard" to set PMA diagnosis[6]. Abscess protrusion into pharyngeal lumen may give the impression of parapharyngeal abscess; however, PMS is located to the lateral pharyngeal wall among pharyngeal mucosa and pharyngeal constrictors, extends under the hyoid bone and passes medial to it; in contrast other spaces pass lateral to (e.g. carotid space) or end to the hyoid bone (e.g. parapharyngeal space). MRI may also be used, while ultrasonography cannot identify PMS adequately.[6]

Streptococcus pyogenes and *Staphylococcus aureus* were the commonest bacteria species in our series. Microbiology of PMA seems to be similar to other DNIs and related to pharyngeal microflora.[3,6] However, we had only a small number of positive cultures, so on these grounds safe and generalized conclusions cannot be made. Empirical therapy with IV-ampicillin/sulbactam combined with metronidazole or clindamycin seemed to be effective in our practice.

Skoulakis et al, suggested that "*the abscess, as a rule, is drained spontaneously* "[6]. In our series spontaneous drainage was noted in 49,1% of patients, and the mean time until spontaneous drainage was 1.8±0.8 days from admission. In all instances spontaneous opening was small and the flow of pus was slow allowing the patient to swallow it; we believe this was the main reason why no compilation related to tracheobronchial pus aspiration was noted in any of these patients. PMS lying just deep to pharyngeal mucosa while dense connective tissue is present only in its deeper border, hence hindering infection spread towards deeper spaces and facilitating pus drainage intraluminal in case of PMA by virtue of least resistance. Furthermore, pharyngeal constrictor's pressure on the abscess during the pharyngeal peristaltic wave facilitates spontaneous drainage through the "vulnerable" mucosa. Transoral drainage under local anesthesia or aspiration may also be performed in order to shorten hospital-stay.

In our series, no major adverse event was noted and no further surgical intervention was needed. Superficial PMS location in pharyngeal lumen and dense deep border together with spontaneous drainage may be the reasons why abscesses constrained in PMS fare better than other DNIs.

Even though our data withdrawn from a prospectively collected database, retrospective nature of our study is the main limitation. On the other hand, we believe that the relatively large number of cases minimizes bias and present meaningful results.

In conclusion, our study suggests that PMAs, are not so rare as they are considered to be; however, there is a lack of literature on this space abscesses. PMAs have much in common with other DNIs but they are less dangerous than their deep-seated counterparts, since its superficial location renders them amenable to spontaneous drainage, aspiration, incision and drainage intraorally obviating spread to deeper structures.

Conflict of interest: None to declare.

Data availability statement: The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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Figure 1: CT-scan with contrast of pharyngeal mucosal space abscesses (PMA).

a. right side PMA protruding into the pharyngeal lumen; it locates to the lateral pharyngeal wall just under pharyngeal mucosa and medial to pharyngeal constrictors, away from ipsilateral carotid artery and internal jugular vein.

b. right side PMA protruding into the pharyngeal lumen and passing medial to hyoid bone, away from ipsilateral carotid artery and internal jugular vein.

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