

# Infectious Cervical Pneumorachis with a Fatal Outcome: A Case Report

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**Abstract:** Pneumorachis is the presence of gas in the spinal canal. It is usually a result of trauma or iatrogenic, where it is usually asymptomatic and is managed conservatively. However, pneumorachis due to gangrenous inflammation in vicinity is extremely rare and may be considered a sign of poor outcome. Necrotizing soft tissue infections are fulminant and life-threatening entity. In contrast to the localized deep neck infections, they spread swiftly, invading adjacent areas. We present a rare case of retropharyngeal necrotizing infection with involvement of the spinal canal and pneumorachis that has not been published before.

**Keywords:** Necrotizing fasciitis; Pneumorachis; Retropharyngeal.

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## 1. Introduction

Pneumorachis is the presence of gas in the spinal canal. It was first described by Gordon and Hardman in 1977 [1]. It is usually a result of trauma or iatrogenic or direct extension of gas from adjacent site like pneumothorax [2-5]. Patients with pneumorachis are managed conservatively as it is usually asymptomatic, does not migrate and reabsorbs completely in several days [6]. Rarely, pneumorachis may be a consequence of gangrenous inflammation in vicinity or a result of septicemia [5,7,12]. In these cases, pneumorachis may be considered a sign of the severity of the infection and an indicator of poor outcome.

Necrotizing fasciitis (NF) is a potentially fatal entity, which often involve skin and superficial fascia, but can also affect deep fascia and muscle. In the latter case some prefer to differentiate necrotizing soft tissue infection from NF [8-10]. Cervical necrotizing soft tissue infection is rarer with significantly worse prognosis. Involvement of the retropharyngeal space has been rarely reported [3, 4]. Early diagnosis and meticulous surgical debridement are the mainstay of treatment [2, 5].

We describe a case of a fatal retropharyngeal necrotizing soft tissue infection, extending to the spinal canal with pneumorachis that has not been published before.

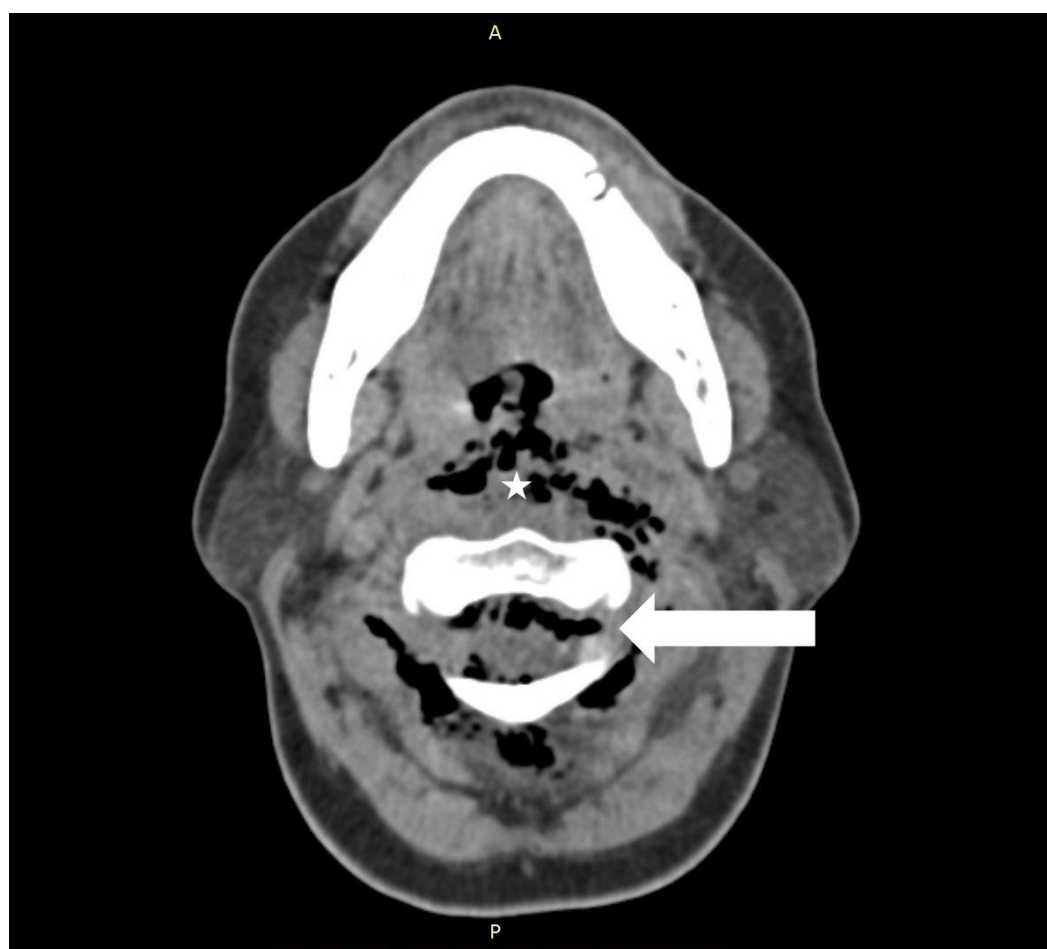
## 2. Case Report

A 61-year-old female with fever 39.8 °C and severe throat pain. She was unable to swallow fluids and foods and own saliva. The symptoms have progressed in a week. She was treated at home with homeopathy. At admission, she had foetor ex ore, drooling saliva mixed with a greyish black exudate, no trismus. There was redness and swelling of a rear pharyngeal wall with a small ulcer from which a necrotic material was draining. There was painful swelling of the neck, but no erythema. Blood pressure was 120/70, heart

rate 115, Complete blood count showed WBC:  $38 \times 10^9 / l$ , glu: 26.4 mmol /l. She was not treated for diabetes until this moment.

Computed tomography (CT) of the neck found gas collections in the retropharyngeal and lateropharyngeal space (Figure 1). As well as at the back of the neck, in the spinal canal from the level of the axis of C2 to the 2nd thoracic, and in the subclavicular area and around the apices of lungs (Figure 2). The retropharyngeal space was drained transorally. Necrotic tissue was found and no pus. It was then rinsed with iodine solutions and diluted hydrogenperoxide. The lateral space was drained externally but did not reveal any purulent collection or necrotic areas. At the intensive care unit treatment started with Clindamicyn, Metronidazole, Meropenem, Amikacin.

**Figure 1.** CT axial view showing retropharyngeal gas producing infection (star), with pneumomachis (arrow).



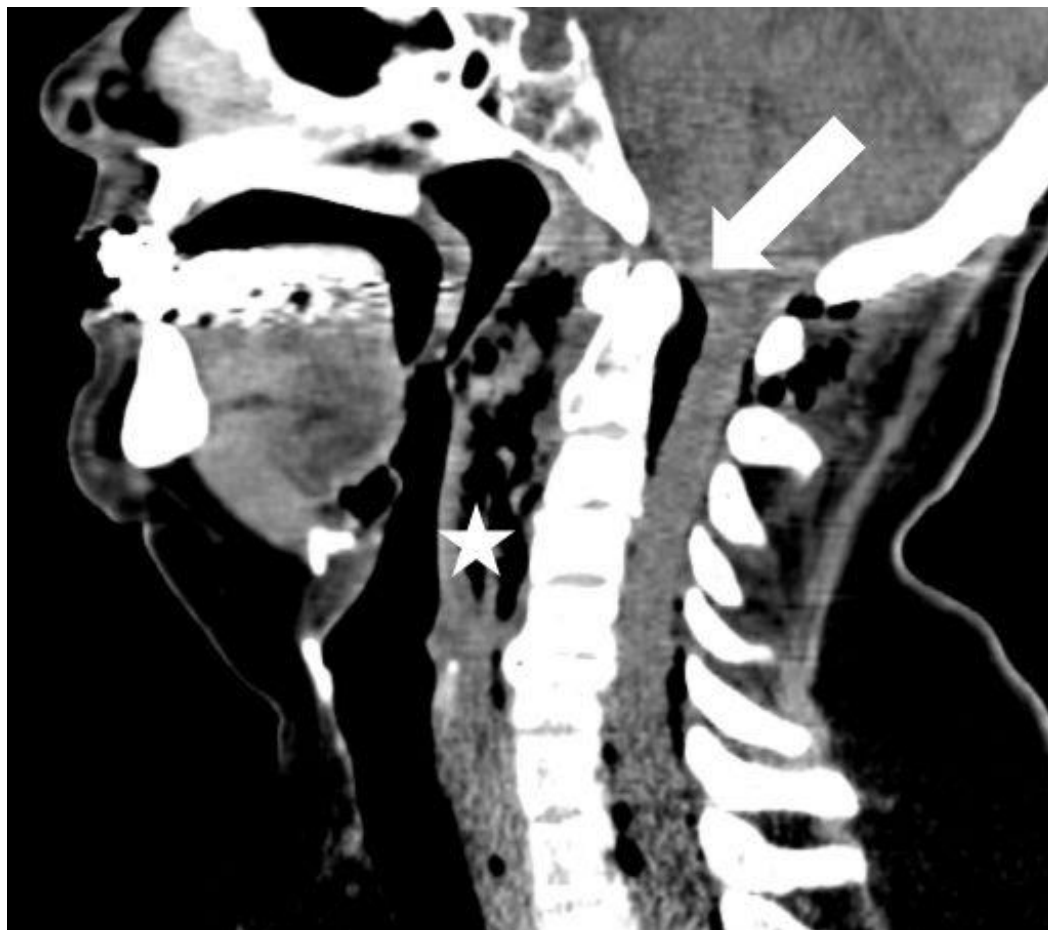
Daily debridement and lavage were performed. Circulation was restored, she was afebrile. Wound culturing revealed *Streptococcus pyogenes* – a known to cause necrotizing soft tissue infection. Inflammatory markers started to drop, but the patient suffered acute circulatory failure and cortical damage 48 hours of admission. She passed away 4 days later with multiple organ failure.

### 3. Discussion and conclusion

Necrotizing soft tissue infection of the head and neck is a rare, life-threatening, infection. Usually involves superficial fat and fascia with necrosis of the overlying skin. Predisposing factors are diabetes, obesity, peripheral vascular disease, chronic renal failure, poor nutritional status, smoking or old age [13]. When involving the retropharyngeal space and deep fascia of the neck the typical erythema and swelling of the skin may be

missing, crepitus not palpable. Patients may not complain of pain because of damage to the neural structures [14]. The combination of the above might have been the reason why in our case, patient was treating herself at home for sore throat with homeopathic agents and presented to the hospital only when her general condition deteriorated. She presented with the signs of systemic inflammatory response and drooling necrotic foul-smelling saliva from a necrotic fistula on the posterior pharyngeal wall.

**Figure 2.** CT sagittal view showing retropharyngeal gas producing infection (star) and gas in the spinal canal (arrow).



Late presentation and untreated diabetes had already worsened the prognosis in this case. However, the presence of gas on CT, not only retropharyngeally, but also in the spinal canal, and around the apices of the lungs revealed the real, unexpected extent of this disastrous infection. Pneumorachis, because of an infection is a rare finding itself. It can be a result of central nervous system infection, sepsis and rarely direct extension of a neighboring infection [2-5, 12]. Most of the cases of pneumorachis resulting from neighboring infection published were related to abdominal and retroabdominal infections [7,15-17]. In cases of gas producing infections, pneumorachis may lead to changes in the cerebrospinal pressure [6]. Rehman et al. concluded that the presence of gas in the spinal canal in cases of abdominal emergencies is a poor prognostic sign [5]. On the other hand Matsuo described a case of pneumorachis from the cervical to the sacral spinal canal with spinal epidural abscess by gas gangrene, which was successfully managed conservatively [7].

Cervical necrotizing soft tissue infection is a known complication of dental and pharyngeal infection [14, 18]. However, we did not find in the literature cases of deep neck

infection extending to the spinal canal. Very similar case of gas producing infection affecting cervical spine, posterior neck and anterior chest wall was described by Thompson and Crawford. The etiology however was a metastatic gas gangrene [12]. The authors considered pathology to be too extensive to be amenable to surgical debridement in our case, we believe fatal outcome was defined by the severe necrotizing soft tissue infection caused by *Streptococcus pyogenes* and precipitated by possible changes in cerebrospinal pressure due to pneumorrhachis.

In conclusion this case shows that severe infections of the cervical region may directly extend to the cervical spinal canal. In these cases, debridement may be virtually impossible. Gas buildup in the spinal canal may lead to changes in cerebrospinal pressure and lead to fatal outcome.

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**Conflicts of Interest:** None.

**Supplementary Materials:** None.

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