CAPNOCYTOPHAGA SPUTIGENA EMPYEMA

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REFERENCES

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Empyema is a problem faced by clinicians worldwide. Most are caused by Gram-positive organisms such as *Streptococci* and *Staphylococci*. Empyema caused by *Capnocytophaga spp* is extremely uncommon\(^1\). We present a unique case of a polymicrobial empyema, with a predominance of *Capnocytophaga sputigena*, in an older patient with no history of animal bite or splenectomy.

**CASE REPORT**

Our patient was a 68 year old male, who had a significant past medical history only of hypertensive intracranial hemorrhages managed conservatively, vascular dementia and a left parotid pleomorphic adenoma also managed conservatively.

He presented with 3 days of fever, cough and dysphagia. The chest radiograph showed right sided consolidation and effusion. He was treated initially with Amoxicillin-clavulanate and then Meropenem in view of the limited response. A Computed tomography scan of the thorax then revealed a large right loculated pleural effusion with pleural enhancement (*Fig 1*). Hence, a chest drain was inserted and the pleural fluid investigation revealed an acute neutrophilic inflammatory yield with scanty amounts of *Coagulase-negative Staphylococci*. The patient was subsequently discharged and continued on 6 weeks of Cloxacillin and appeared to respond well initially. He was also started on naso-gastric tube feeding in view of his dysphagia.

He was re-admitted 1 month later after being noted to be hypoxic during clinic follow up. His chest radiograph showed worsening of the right sided empyema (*Fig 2*). He was empirically started on Meropenem and Vancomycin. A chest drain was inserted and purulent, foul-smelling pleural fluid was obtained.
Pleural fluid investigations revealed pleural fluid pH to be 6.4. The pleural fluid cultures grew heavy amounts of *Capnocytophaga* spp and scanty amounts of *Pseudomonas aeruginosa*. *Capnocytophaga* spp was confirmed by the heavy growth of small slightly yellowish colonies on the anaerobic plates. The organism appeared as Gram-negative fusiform rods on Gram stain and was oxidase, catalase and indole negative but esculin and ONPG positive. The organism was subjected to matrix-assisted laser desorption ionization (MALDI-TOF), using the Bruker Biotyper system with version 3.1 software and database, which gave a score of 1.922 for *Capnocytophaga sputigena*. No oropharyngeal culture was performed on the patient.

A consult with the Infectious Disease specialist was sought and the antibiotic regime was adjusted to intravenous Ceftazidime and oral Amoxicillin.

In view of the presence of *Capnocytophaga sputigena*, a computed tomography scan of the neck and thorax was done, which revealed no gross collections or any suggestion of esophageal perforation. The patient had been bed bound due to his recurrent strokes and had been cared for solely by his wife and maid. His wife confirmed that the patient had no history of animal contact apart from their pet hamsters. An oral swab and stool culture from the patient’s hamsters did not reveal the presence of *Capnocytophaga spp*.

The patient responded clinically and remained afebrile. Inflammatory markers were on the downward trend and the repeated chest radiograph showed significant interval improvement of the empyema. The chest tube was subsequently removed after minimal drainage was noted. The antibiotics were de-escalated to Amoxicillin and...
Ciprofloxacin and the patient was discharged well on day 14. He was seen in the outpatient clinic within a month and completed 6 weeks of antibiotics.

**DISCUSSION**

Empyema is a serious complication of pneumonia with high morbidity and mortality rates\(^2\text{-}^3\). Treatment of empyema includes appropriate antibiotic coverage based on the suspected bacteriology and the resistance patterns and drainage of the empyema.

In the past, *Streptococcus pneumoniae*, *Streptococcus pyogenes* and *Staphylococcus aureus* were the traditional pathogens that were associated with empyema. However, in recent years, there has been a noted change in empyema microbiology for unclear reasons, with a shift towards *Streptococcus milleri*, a part of normal oral flora, being noted\(^3\text{-}^4\).

As far we are aware, there have been only two prior case reports of *Capnocytophaga* empyema reported. One was secondary to a laparoscopic Nissen fundoplication\(^5\), in which the *Capnocytophaga* species was not described, but the patient responded well to Clindamycin, Penicillin G and Fosfomycin. The other was a spontaneous empyema in a patient who suffered from Hepatitis C induced liver cirrhosis\(^6\), of which the pleural fluid grew *Capnocytophaga ochracea*, and the patient responded to Imipenem-cilastatin. *Capnocytophaga* is a fastidious Gram-negative bacillus that is more commonly found in the oropharynx of dogs and cats, although it is known to have been found in the oropharyngeal flora of humans. *Capnocytophaga* infections usually occur following animal bites or in patients post-splenectomy. In a case series of
Capnocytophaga infections from Austria\(^1\), the patients were either immunocompromised or developed the infection as a result of iatrogenic causes. If not treated, the pathogen can result in septicemia, multi-organ failure and death especially in immunocompromised patients. In this case series, Capnocytophaga infections resulted in a 50% mortality rate. Our patient was eventually noted to have Capnocytophaga sputigena, which is a commensal usually found in the oropharynx.

The recent introduction of the MALDI-TOF has been able to provide rapid identification of bacteria and thus theoretically allow earlier intervention. Fedorko et al. compared the use of MALDI-TOF with 16s rRNA sequencing for identifying bacterial isolates and found it adequate in the identification of Capnocytophaga sputigena with scores of >2.0, which was higher than the determined cut-off of 1.8 used for accurate identification of the bacteria species and genus\(^7\). In our case, additional biochemical testing was performed and these were consistent with the final identification of Capnocytophaga sputigena given by the MALDI-TOF.

There has been no consensus of the first-line empirical treatment of Capnocytophaga infections given its rare incidence, although most Capnocytophaga spp. have been known to be susceptible to Clindamycin, Imipenem-cilastatin and B-lactamase inhibitor, while there is variable susceptibility to Penicillins and Cephalosporins\(^8\). Our patient’s Capnocytophaga sputigena was found to be susceptible to Ampicillin and Ceftriaxone, with no antibiotic resistance noted. We treated him with Ceftazidime and Amoxicillin for one week and subsequently de-escalated to Ciprofloxacin and Amoxicillin. Capnocytophaga spp have been reported to produce B-Lactamase\(^1\), which...
may result in resistance to Penicillins. Fortunately, this was not the case in our patient and
he responded well.

CONCLUSION

Capnocytophaga empyema is a rare entity which has the potential to result in high
mortality rates. With an aging population, availability of better diagnostic investigations
and increasingly diverse companion animals, clinicians should be alert for unusual
organisms causing empyemas. Close collaboration between microbiologists and
clinicians is essential to ensure good outcomes for our patients.
References


Figures

Fig 1: Loculated right pleural effusion with pleural enhancement
Fig 2: Interval worsening of the right pleural effusion