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Case report

A pyo-hydropneumothorax with sepsis, secondary to *Gardnerella vaginalis* infection in a post-partum female

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ABSTRACT

A 20 year old female, 14 days post partum, presented to the Emergency Department in severe respiratory distress. Imaging of her chest revealed a left tension hydropneumothorax with significant mediastinal displacement. A chest drain was inserted and over 4L of cloudy-brown malodourous fluid was drained. Gardnerella Vaginalis was isolated on culture of the fluid. The pyohydropneumothorax and associated sepsis, was refractory to management with a chest drain and antimicrobial therapy. She required a video-assisted thoracoscopic surgery and decortication of her unexpanded lung. She ultimately made a full recovery. Gardnerella vaginalis is considered a dysbiosis of the genitourinary tract, rather than an overtly virulent pathogen. Although extremely rare, there are occasional reports of Gardnerella vaginalis causing infection, even at sites distant from the genitourinary tract. To our knowledge, this is the first documented case of Gardnerella vaginalis causing respiratory sepsis and a pyohydropneumothorax in a healthy, immunocompetent female during the post-partum period. Although it is a unique case, nevertheless, it highlights the need for physicians to be congnisant of G. vaginalis as a potential pathogen when treating post-partum sepsis and indeed, even as a potential pathogen when treating pulmonary infections in obstetric patients. This will lend to prompt initiation of appropriate antimicrobial treatment.

1. Case

A 20 year old female, 14 days post partum (Gravida 0 Para 1) presented to the Emergency Department complaining of severe left-sided pleuritic chest pain, shortness of breath and pyrexia. She was 14 days post-partum following a normal vaginal delivery. Her symptoms began 2–3 days post-partum and were attributed to a musculoskeletal source. Lack of symptom resolution prompted treatment with broad-spectrum oral antimicrobials; oral amoxicillin-clavulanic acid 625 mg TDS for presumed lower respiratory tract infection. However, when her symptoms deteriorated she self-presented to the Emergency Department 2 days later, in severe respiratory distress with absent chest expansion, dullness to percussion and reduced air entry on the left side. Imaging of her chest on admission revealed a left tension hydropneumothorax with significant mediastinal displacement and mixed density fluid containing air within the fluid component of the hydropneumothorax (Figs. 1 and 2).

Initial haematological investigations showed leukocyte count: 30×10^9L; neutrophils: 28×10^9L; haemoglobin: 9.8 g/L; C reactive protein (CRP) 370mmol/L. Blood cultures yielded no growth. A chest drain was inserted which provided symptomatic relief and 1500 mL of

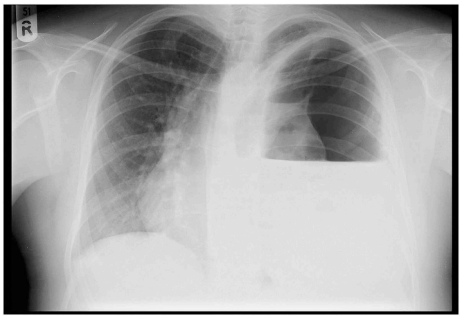

Fig. 1. Erect chest radiograph on day of admission showing left tension hydropneumothorax with significant mediastinal displacement.

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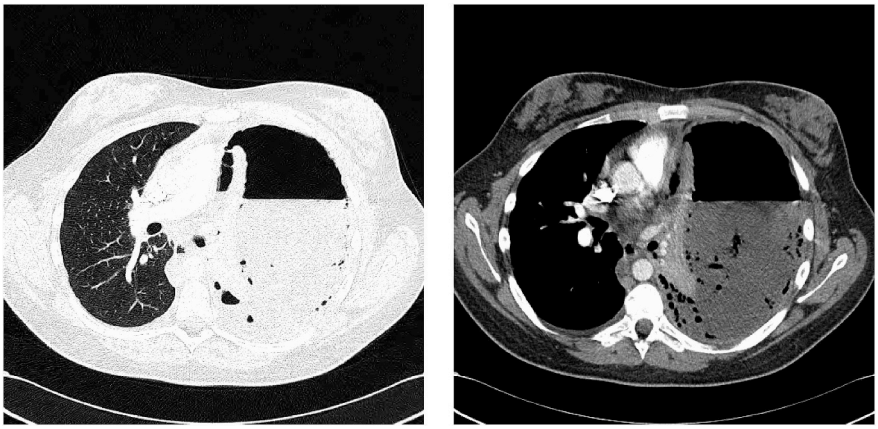

Fig. 2. CT thorax on day of admission showing a left tension hydropneumothorax with significant mediastinal displacement and mixed density fluid containing air within the fluid component of the hydropneumothorax.

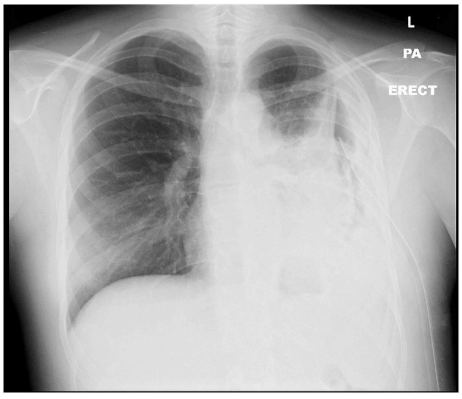

Fig. 3. Erect chest radiograph on day 7 showing left-sided chest drain *in situ*, extensive loss of volume and consolidation in left hemithorax.

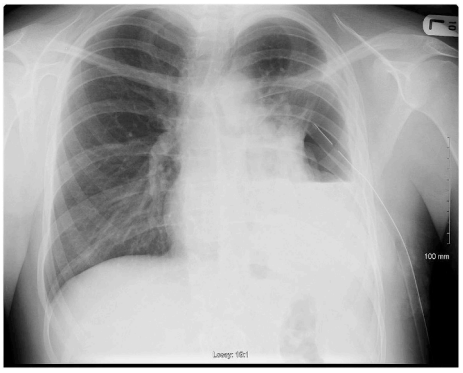

Fig. 4. Erect chest radiograph on day 16 showing persistent left sided atelectasis and hydropneumothorax despite intervention with chest drain and 16 days of intravenous antibiotics.

cloudy-brown, malodourous fluid was drained. She was commenced on empiric broad-spectrum intravenous (IV) anti-microbial therapy with Piperacillin-Tazobactam 4.5g TDS and Vancomycin 15mg/Kg (1g) BD. The pleural fluid drained was sent for biochemical and microbiological analysis with the following results:

- o Gardnerella. vaginalis on culture
- o pH < 6.3
- o Leucocytes 388,800/μL (80% polymorphs)
- o Protein 48g/L, glucose 0.6mmol/L, cholesterol 2 mmol/L, triglyceride 0.7 mmol/L

Despite medical management with these IV antimicrobials and interventional management with a chest drain, she did not show signs of clinical improvement. A repeat chest radiograph on day 7 showed extensive loss of volume and consolidation in left hemithorax (Fig. 3) thus an additional third antimicrobial, clindamycin 800mg IV TDS, was commenced.

Notwithstanding draining 4.2L of pleural fluid, repeated CT thorax and chest radiograph at day 14–16, showed a persistent loculated complex pyohydropneumothorax remaining, which was refractory to management with a chest drain (Figs. 4 and 5).

She was transferred to a cardiothoracics tertiary facility and underwent a video-assisted thoracoscopic surgery (VATS), followed by a decortication procedure. At her 6-month interval follow up she was clinically well, a bronchoscopy was unremarkable and the hydropneumothorax had resolved with some residual volume loss on left side (Fig. 6).

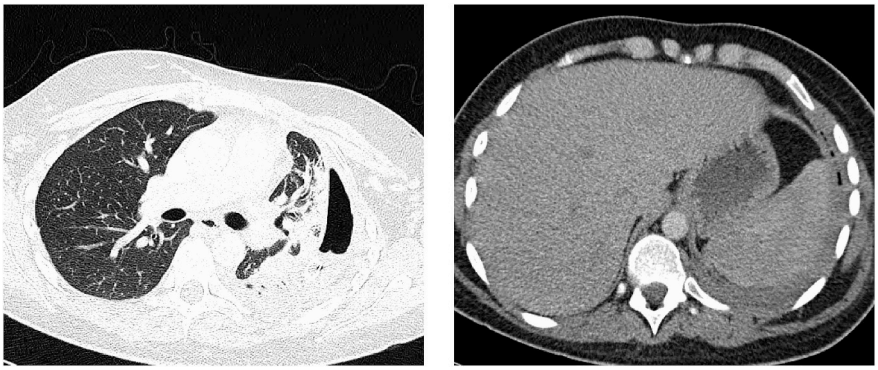

Fig. 5. CT thorax on day 14 showing persistent pleural effusion containing multiple locules of air. Lung not fully expanded.

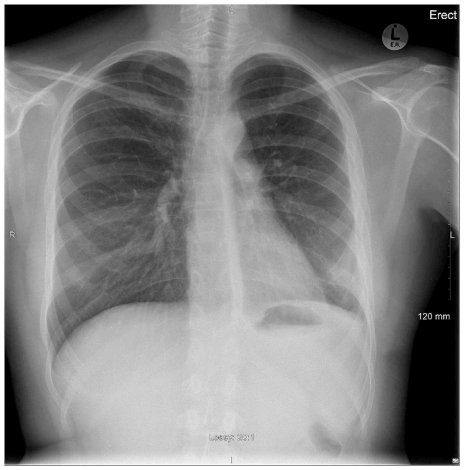

Fig. 6. Erect chest radiograph at 6-month follow up showing resolution of hydropneumothorax and minimal residual pleural change on right side.

To our knowledge, this extraordinary case is the first documented case of a pyohydropneumothorax due to *G. vaginalis*, in a healthy, immunocompetent female during the post-partum period.

2. Discussion

G.vaginalis, previously known as *Corynebacterium vaginale* and *Haemophilus vaginalis* [1], is a facultative anaerobic, Gram-variable staining bacterium that is typically a small non-spore forming coccobacillus [2]. It is not part of the normal vaginal flora at birth but rather is acquired through sexual transmission from an infected partner. It is primarily confined to genitourinary (GU) system and is associated with bacterial vaginosis (BV), the most common vaginal infection worldwide [3]. It's presence can be considered a 'dysbiosis' rather than overtly virulent [3,4], however in obstetric patients, *G. vaginalis* is a recognized, although rare pathogen, contributing to puerperal sepsis, chorioamnionitis and fetal sepsis [5,6].

Interestingly, it has also been cited as an aetiologic factor in male bacteremia [7] and perinephric abscess formation in a male patient [8]. In this case, *G. vaginalis* was isolated in the pleural fluid 2 weeks post-partum. Though extremely rare, there are occasional reports of *G. vaginalis* causing infection at sites distant from the GU tract (please refer to Table 1); in one case causing osteomyelitis of the spine [9] and in another case, *G. vaginalis* was isolated from pulmonary abscesses in a male alcoholic [10].

It has been hypothesized that the proliferation of organisms in the immediate post-partum period is due to their opportunistic spread from the vagina, via the placental bed following mucosal injury during delivery [5,6]. In our patient, *G. vaginalis* was isolated from pleural fluid two weeks post-partum, presumably via haematogenous extension following trauma to the GU tract post-delivery. Despite repeated blood and urine cultures, *G. vaginalis* isolation from pleural fluid was the only source of the patient's respiratory empyema and sepsis. We hypothesise that the patient's treatment with broad-spectrum antibiotics in the days preceeding her admission, may have prevented isolation of G. *vaginalis* from her blood cultures. An alternative hypothesis is that oral aspiration of bodily secretions may have occurred during the vaginal delivery.

In summary, to our knowledge, this is the first documented case of *G. vaginalis* causing pyohydropneumothorax and associated respiratory sepsis in the post-partum period. Although unusual, this case highlights the need for physicians to be congnisant of *G. vaginalis* as a potential pathogen when treating post-partum empyema, and indeed, even as a potential pathogen when treating any pulmonary complications in the obstetric patient, which will lend to prompt initiation of appropriate antimicrobial treatment.

Table 1
G.vaginalis infections at sites distal to genitourinary tract.

Reference (year of publication)	Patient details age in years (y)	Summary	Microbiology results	Author's comments
[7] (2008)	Male, 41y	Male with nil medical history of note, presented with dysuria, haematuria and pyrexia.	*G.vaginalis* isolated in blood cultures.	The first case of urolithiasis complicated by *G.vaginalis* bacteremia in an otherwise healthy male patient.
[8] (2005)	Male, 50y	Presented with general malaise and occasional rigors. Imaging revealed perinephric abscess and pleural empyema.	*G.vaginalis* isolated from cultured aspirate of perinephric and pleural pus.	*G.vaginalis*, isolated from multiple systemic sites causing sepsis in immunocompetent male.
[9] (2009)	Female, 38y	Presented to hospital with headache and noted to have tenderness in lumbosacral region, MRI showed osteomyelitis & discitis.	*G.vaginalis* isolated from disc space aspirate cultures. Blood cultures were negative.	*G.vaginalis* as a cause of deep spinal infection. Possible spread from Genitourinary tract via Batson's plexus or haematogenous route.
[10] (1989)	Male, 41y	Chronic alcohol user, admitted to hospital following loss of consciousness, developed pyrexia with right sided pneumonia.	*G.vaginalis* isolated in blood culture and bronchoscopic aspirates.	This patient presented with signs of inhalation bronchopneumonia, with abscess and septicemia, due in part to *G.vaginalis*.

Conflict of interest

No conflict of interests have been identified for any author.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.rmcr.2019.01.007.

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