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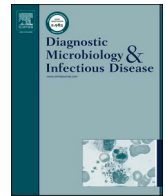
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## Case Report

## *Gardnerella vaginalis* ventilatory acquired pneumonia among patients with trauma

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## ABSTRACT

*Gardnerella vaginalis* (*G. vaginalis*) is a bacterium rarely responsible for systemic infections and is exceptionally isolated from bronchopulmonary samples. Here, we report here two patients with trauma who were diagnosed with a *G. vaginalis* ventilatory acquired pneumonia (VAP) via mini bronchoalveolar lavage (mini-BAL). According to our observations, *G. vaginalis* was the only microorganism with a significant threshold and the identification was obtained by a reliable mean. There is no recommendation for antibiotic treatment for invasive *G. vaginalis* infection. We treated these infections with Cefotaxim and Metronidazole which clinically improved the infection. To determine whether the two patients were infected by the same strain, we used a random amplified polymorphic DNA (RAPD) technique. The two *G. vaginalis* organisms had distinct RAPD profiles, suggesting the absence of cross-transmission. These two cases of trauma and *G. vaginalis* VAP suggest that this infection cannot be ruled out and should alert the clinician to treat it.

## List of abbreviations

*G. vaginalis* *gardnerella vaginalis*  
MALDI-TOF matrix-assisted laser desorption/ionization time of flight  
Mini-BAL mini-bronchoalveolar lavage  
RAPD random amplified polymorphic DNA  
VAP ventilatory acquired pneumonia

## 1. Background

*Gardnerella vaginalis* (*G. vaginalis*) is a facultative-anaerobic, gram-variable bacterium that is primarily found in the vaginal microbiota. *G. vaginalis* implicated in cases of vaginosis or infections of the genitourinary tract, but it is rarely responsible for systemic infections and exceptionally isolated from bronchopulmonary samples.

Here, we report here two patients who suffering from trauma who where diagnosed with *G. vaginalis* ventilatory acquired pneumonia (VAP) via mini bronchoalveolar lavage (mini-BAL) during a six-month period. To our knowledge, only three cases of *G. vaginalis* pulmonary infections have been reported in the literature [1–3]. Unlike our two patients, the three patients found in the literature had pulmonary infections caused by *G. vaginalis* in mixed microbiota, and had VAP.

## 2. Case presentation

The first patient suffered from a 2.5 m fall. He is a 58 year-old male with a history of arterial hypertension and a depressive syndrome. He presented to the emergency department with polypnea, intercostal recessions and desaturation to 90% SpO<sub>2</sub> under ambient air conditions. A body CT-scan revealed severe chest trauma with an Abbreviated Injury Scale (AIS) score of 3 and a Thorax Trauma Severity Score (TTSS) of 12, associated with fractures of the right pedicles L1 to L3, right clavicle fractures, right scapula fractures, right thumb dislocation fractures, and significant subcutaneous emphysema from the facial mass to the scrotum. Two thoracic intercostal spaces were set up under water sealed drain. Despite this, the patient developed respiratory degradation requiring invasive mechanical ventilation. Given the Acute Respiratory Distress Syndrome (ARDS) presentation, he was put under neuromuscular blockers and underwent 3 sessions of prone positioning. The patient presented with VAP due to *Gardnerella vaginalis* after 20 days of mechanical ventilation, treated with Cefotaxime-Metronidazole. Due to prolonged mechanical ventilation, a tracheotomy was performed for the expected long duration of mechanical ventilation. Respiratory weaning was subsequently achieved.

The second patient presented with a high-velocity road traffic

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accident. He was 28 year-old man with no previous medical history. A body CT-scan revealed traumatic brain injury (right meningeal hemorrhage), no-neurological spine injury (unstable C3, C4 and C5 fractures without posterior wall recoil), a fracture of the left scapula, an open fracture of the left radius, a fracture of the right orbit and a fracture of the right foot.

Given the indication for surgery, the patient was intubated and sedated. He presented with *G. vaginalis* VAP after 5 days of mechanical ventilation and was treated with Cefotaxime-Metronidazole. The patient was successfully extubated after 17 days of mechanical ventilation.

### 3. Discussion and conclusions

In our observations, *G. vaginalis* was the only microorganism identified in the mini-BAL with a significance threshold and the identification was obtained by a reliable method: matrix-assisted laser desorption/ionization time of flight (MALDI-TOF) with a concordance score above the threshold defined for correct identification using this technique [4]. Mini-BAL were performed using were performed using single-use fiberscopes. There is no recommendation for antibiotic treatment of invasive *G. vaginalis* infection, and no antibiogram was performed because no specific breakpoint was set by the European Committee on Antimicrobial Susceptibility Testing [5]. Therefore, we treated these infections with Cefotaxim and Metronidazole which led to clinical improvement. For one patient, another mini-BAL was performed via the same technique and did not reveal a persistent infection.

Because of the atypical nature of this VAP, we investigated whether it was the same strain was present in both patients. A survey of the staff working in the units on the previous days and on the day of sampling established that they were all different, and all mini-BAL was performed with a single-use bronchial fibroscope. These two patients were hospitalized several months apart, in different bedrooms.

The operational hygiene team informed us that there were no surface or pipe samples to be collected for this bacterium. Therefore, to determine whether it was the same strain was present between the different patients, we used a random amplified polymorphic DNA (RAPD) technique. The two *G. vaginalis* organisms had distinct RAPD profiles, suggesting the absence of cross-transmission (Fig. 1).

The biofilm-forming potential and cytotoxic activity of *G. vaginalis* could be associated with its virulence potential [6]. In our cases, it was impossible to carry out a respiratory biofilm analysis.

*G. vaginalis* was found in only in one other patient whose sample was not available at the time of analysis, so it could not be compared with the other organisms.

Thus, these two cases of trauma and *G. vaginalis* VAP suggest that this infection cannot be ruled out and should alert clinicians to treat it.

#### Ethics approval and consent to participate

There was no need for ethics approval.

#### Availability of data and materials

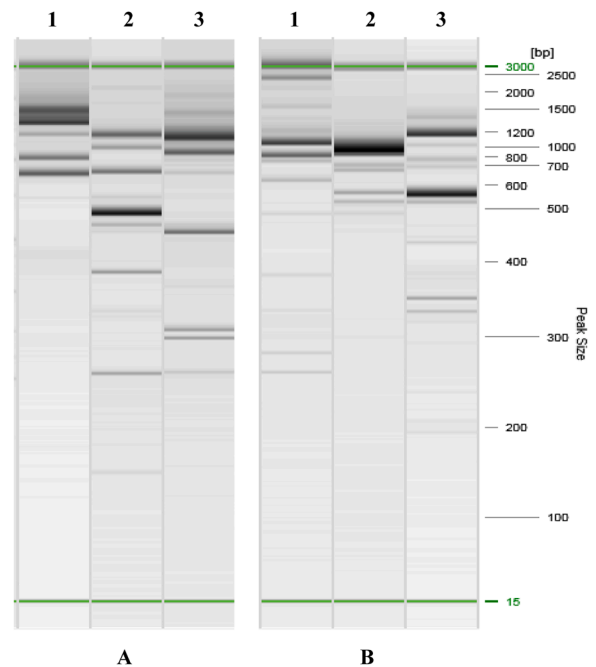
The data are available from the corresponding author.

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#### CRedit authorship contribution statement

Valentin De Villiers De La Noue: Writing – review & editing,



**Fig. 1.** RAPD profiles of individual *Gardnerella vaginalis* strains isolated from patient 1(1), patient 2 (2) and an unlinked control strain (3). PCR-fragments obtained with two primers (A) (B) showing two distinct profiles.

Writing – original draft. **Lucien Brasme:** Writing – review & editing, Writing – original draft, Validation, Methodology, Investigation, Conceptualization. **Odile Bajolet:** Writing – review & editing, Writing – original draft, Methodology, Investigation. **Vincent Legros:** Writing – review & editing, Writing – original draft, Validation, Supervision, Project administration, Conceptualization.

#### Declaration of competing interest

All the authors declare that they have no conflicts of interest related to this publication.

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