

Pleuro-Pneumopathy A *Salmonella Choleresuis* Complicating a Pulmonary Abscess

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Abstract: *Salmonella* are Gram-negative, motile and facultative anaerobic bacilli. The genus *Salmonella* consists of two species (*S. enterica* and *S. bongori*), with *S. enterica* being the most common. *Salmonella* infections are usually manifested by gastroenteritis, bacteremia or septicaemia. Extra-intestinal complications, such as pleuro-pulmonary complications secondary to non-typhoid serotypes are extremely rare, with only a few cases in the last century. These are usually immunocompromised patients. But it is necessary to know how to evoke them even in the absence of notion of acute diarrhoea preceding the appearance of the respiratory symptomatology, and also, to seek the risk factors and possibly, other secondary localizations. We report a case of purulent pleurisy with *Salmonella choleresuis* sp complicating a pulmonary abscess.

Keywords: *Salmonella choleresuis* spp *arizonae*, Pleuro-Pneumopathy, pulmonary

1. Background

Salmonellosis are infections caused by Gram-negative Bacilli of the Enterobacteriaceae family, whose tropism is digestive. The non-typical forms typically manifest themselves as acute diarrhea, and are called "minor". Rarely, they can be responsible for systemic infections with extraintestinal localizations, especially in immunocompromised individuals [1]. We report a case of purulent pleurisy with *Salmonella choleresuis* sp complicating a pulmonary abscess.

2. Case Report

This is a 56-year-old patient, known to be a type 2 diabetic. She was admitted to the emergency department of MRVH for acute chest pain and dyspnea. Clinical examination revealed a fever of 39°C and tachycardia. Bilateral and comparative auscultation of the two pulmonary fields revealed a vesicular murmur and abolished vocal vibrations in the right hemithorax. On percussion, the hydrous matte was found, in favour of a right unilateral fluid effusion syndrome. The cardio-vascular examination was without particularity.

Chest x-ray showed a right unilateral pleural effusion of medium abundance. A pleural puncture allowed the evacuation of a cloudy liquid collected on two sterile vials for bacteriological and biochemical examination. The bioassay revealed hyperleukocytosis at 16000/mm³, CRP at 235mg/l, normochromic normocytic anemia and troponin were 12 ng/l at H0 and 8.2 ng/l at H6. Blood glucose was 3.6 g/l with HbA1c at 8.8%. The patient had a clinico-biological infectious syndrome and benefited from a pleural puncture.

Microscopic examination of the pleural fluid revealed a leukocytosis at 15620/mm³ with a predominantly polynuclear, 92% neutrophilic formula, and Gram-negative bacilli.

The biochemical study of the pleural fluid was in favour of a transudate, with total proteins at 19 g/l. Culture and enrichment on blood culture vials were positive after less than 24 hours of incubation. Microscopic examination after gram staining from the enrichment vial, primoculture and subculture revealed gram-negative bacilli with polymorphic appearance (**Figure 1**).

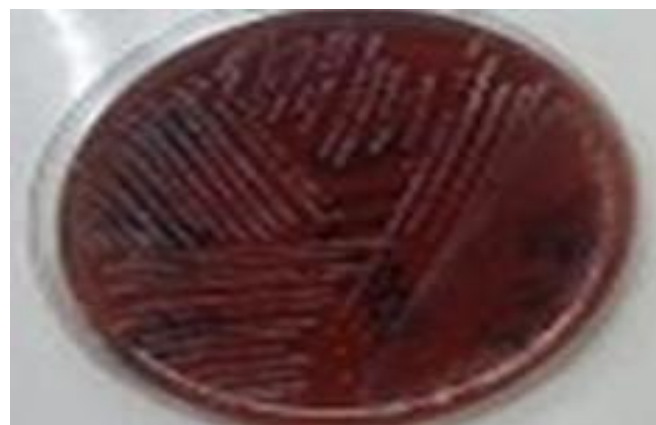


Figure 1: Appearance of *S choleresuis* spp colonies on the middle of the baked chocolate at the laboratory of the Mohammed V Military Hospital

The Api20E gallery (Bio- Mérieux, Marcy l'étoile France) identified a *Salmonella choleresuis* spp *arizonae* (99.7%) with the following characters: ONPG (-), ADH (+), LDC (+), ODC (+), Citrate (+), H₂S (+), Urea (-) TDA (-), Indole

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(-) and VP (-), Gelatinase (-), Glucose (+), Mannitol (+), Inositol (-), Sorbitol (+), L-rhamnose RHA (+), Sucrose (-), Melibiose (+), Amygdalin (-) and L- arabinose (+) (Figure 2).



Figure 2: Biochemical and enzymatic characterization of *S. choleraesuis* spp carried out at the laboratory of the Mohammed V Military Hospital

The Kligler-Hajna medium transplant confirmed the following characters: Lactose (-), Glucose (+) and H₂S (+). Sensitivity testing of the isolated strain by diffusion method according to the recommendations of EUCAST/CA-SFM 2020, showed that this isolate was largely sensitive to the amoxicillin, amoxicillin-clavulanic acid, cefoxitin, ceftriaxone, cefixime, cefepime, piperacillin-tazobactam (TZP), ertapenem, gentamicin, amikacin, netilmicin, trimethoprim-sulfamethoxazole (SXT), norfloxacin and levofloxacin.

A complete assessment in search of a gateway and possible secondary location was performed. Bioassay revealed hepatic cholestasis (normal transaminases, conjugated and total bilirubin, elevated alkaline phosphatase and gamma-glutamyl transferase). Thoraco-abdominal computed tomography (CT) scan revealed a pulmonary abscess, biliary thickening and ileitis.

The patient was put on Ceftriaxone 2g combined with an intravenous aminoside with a good respiratory outcome after 48 hours, but exploration of his hepatic cholestasis is still ongoing.

3. Discussion

Salmonella are Gram-negative, motile and facultative anaerobic bacilli. The genus Salmonella consists of two species (*S. enterica* and *S. bongori*), the species *S. enterica* is the most common and is itself divided into 6 subspecies (*enterica*, *salamae*, *arizonae*, *diarizonae*, *houtenae* and *indica*) on the basis of phenotypic criteria [2]. Salmonella infections are usually manifested by gastroenteritis, bacteremia or septicaemia [2]. Extra-intestinal complications, such as pleuro-pulmonary complications secondary to non-typhoid serotypes are extremely rare, with only a few cases in the last century [3]. These are usually immunocompromised patients (myeloblastic leukaemia, long-term corticosteroid therapy, Hodgkin's disease, diabetes) [3,4,5]. In our case, this is a diabetic patient. One of the mechanisms by which Salmonella can cause lung damage is the activation of the contact system, which leads to massive infiltration of red blood cells and fibrin deposits in the infected lungs [6].

Bacteriological examinations provide a diagnosis of certainty with the positivity of blood cultures in septicaemic forms, or of deep pus in the case of deep visceral localizations [7]. In our case, no blood culture was requested, and only pleural puncture allowed the bacteriological diagnosis. Antibiotic therapy is not

recommended in the usual forms because it increases the risk of chronic carriage of the germ and the rate of relapse, does not shorten the evolution and exposes to the risk of emergence of resistance [8]. However, in the event of complications with a functional or even vital prognosis, early treatment is essential. It must include evacuation puncture, general antibiotic therapy and respiratory physiotherapy [9]. The evolution is generally favourable. Industrial and domestic food hygiene is essential for prevention and is based on the microbiological control of food and beverages, and the detection and avoidance of asymptomatic chronic carriers working in the collective or industrial food sector [8].

4. Conclusion

The pleuro-pulmonary forms of salmonellosis are rare, of course, but it is necessary to know how to evoke them even in the absence of the notion of acute diarrhoea preceding the appearance of the respiratory symptomatology, and also to look for risk factors and possibly other secondary localizations.

Competing interests

The authors declare no competing interest

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