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Pseudotumoral Renal Actinomycosis: A Case Report

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Abstract

Actinomycosis is an uncommon, bacterial infection resulting from anaerobic Gram-positive filamentous bacteria, belonging to the Actinomyces genus. These bacteria inhabit various parts of the body such as the respiratory system, digestive system, and female reproductive tract. The clinical and radiological signs and symptoms of this condition are diverse, resembling several other diseases, including cancer, which can make its diagnosis challenging and frequently delayed. It's important to note that renal involvement in actinomycosis is exceedingly rare. We present a case of a young man who was admitted to the hospital with renal actinomycosis. The patient presented with abdominal pain, night sweats and alteration of the clinical status. He underwent a radical nephrectomy given that the radiological presentation suggested a tumoral cause. The pathology showed the actinomycosis specific « sulfure granules». Our patient received antibiotic treatment with penicillin G initially, followed by a combination of amoxicillin and doxycycline, which resulted in a favourable outcome.

Keywords: Actinomyces; Renal; Infection; Histopathology; Antibiotherapy

Introduction

Actinomycosis is a rare, chronic, and slowly progressive bacterial infection. It is caused by anaerobic and microaerophilic bacteria of the genus Actinomyces, mainly Actinomyces israelii [1]. These bacteria are usual saprophytic germs of the natural cavities of the human being. They normally colonize the oral cavity, the digestive, the respiratory and the female genital tract. Renal involvement is exceptional [2]. Clinical and radiological manifestations are numerous, mimicking several pathologies including neoplasia, making the diagnosis difficult and often delayed.

Case Description

We report the case of a 22-year-old man, without important medical history admitted in our department for symptoms evolving for six months including abdominal pain, night sweats and alteration of the clinical status. In ambulatory, he received symptomatic treatment combined with unspecified antibiotic therapy for a short time without any clinical improvement. An abdominal CT-Scan was carried out showing a tissue mass in the upper pole of the right kidney, infiltrating the anterior, posterior, and superior pararenal space, invading the adrenal and the underlying hepatic parenchyma. It also showed adenomegaly of the right renal pedicle (Figure 1). Laboratory showed, leukocytosis neutrophils (WBC by 13.2 × 10^9/L, neutrophils by 10.5 × 10^9/L). Serum C-reactive protein was by 40 mg/L (N <8 mg/l) and creatinemia was normal. The urine culture was sterile and the HIV serology was negative. In the face of imaging findings, a possible tumour was suspected. We did not perform a biopsy for fear of tumour cell dissemination. A laparoscopic radical nephrectomy with adrenalectomy was therefore done. The specimen was sent to pathology. Macroscopy study had shown enlarged right nephrectomy specimen removing the adrenal gland measuring 160/110/80mm. On section, the upper renal pole is dissociated by a voluminous lesion of pseudotumor appearance, 70 mm in length, solid, greyish-white, necrotic, of heterogeneous consistency, friable and necrotic. This lesion appears to be fistulized in the peri-renal fat, giving rise to a fibroblastic reaction

that encompasses the adrenal gland (Figure 2). Microscopically, it is an inflammatory pseudotumor formation consisting of sheets of inflammatory cells with a predominance of neutrophils creating foci of suppuration. In the centre of these foci, actinomycotic grains can be seen, forming a fine filamentous felting (Figure 3). There are associated fistulous tracts in the peri-renal and adrenal fat. There is no histological sign of malignancy. The microbiological culture was negative. We started with intravenous antibiotic therapy with penicillin G (20 MIU/day) for two weeks combined with oral doxycycline (200 mg/day). We subsequently made the oral relay by amoxicillin (2gx3/day) combined with doxycycline (200 mg/day) for a total duration of 12 months. Follow-up consultations reported a complete disappearance of the clinical signs.

Discussion

Actinomycosis is an uncommon infection that is not well recognized and is seldom considered initially. Its diagnosis is challenging due to its slow progression and diverse range of clinical manifestations. This complexity arises from the lack of specific clinical and radiological indicators. It is a bacterial infection caused by Actinomyces species which are anaerobic, Gram-positive filamentous bacteria [3]. This microorganism normally inhabits the mucosa of the oropharynx, tracheobronchial tree, intestines, and female reproductive system as a saprophyte. Despite its common presence, it rarely causes infections in people with healthy immune system. It has not been reported to be transmitted from one human to another [3]. The crucial step in the development of actinomycosis is the penetration of Actinomyces spp. into various organs and structures due to a mucosal rupture or breach [3]. This disease is characterized by its tendency to form foci of suppuration within the tissues, which evolve spontaneously towards fistulization with an intense inflammatory reaction surrounded by fibrosis. It extends to adjacent tissues, without respect for anatomical barriers [4]. The infection primarily occurs in the cervicofacial area in about 60% of cases, where it typically affects the salivary glands and lacrimal ducts. In approximately 20% to 25% of cases, it is located in the thoracic region and can cause lung or chest wall involvement. About 25% of the cases occur in the abdominal area, with the most common locations being the caecal appendix and the pelvic region in women. Intrauterine devices are thought to be a significant contributing factor to the occurrence of the infection in the pelvic region [5,6]. However, renal actinomycosis is very uncommon, with less than 25 documented cases in adult patients since 1990 [7]. Renal involvement in actinomycosis occurs through two mechanisms: the first is a hematogenous dissemination from other infection sites, while the second mechanism is through contamination by contiguity, which is facilitated by the bacteria's production of proteolytic enzymes [8]. In our case, the source of contamination was not defined. This infection mimics various diseases mainly malignant masses, tuberculosis and fungal infections. In addition, the evolution is often insidious, responsible of a diagnostic delay, source of evolved forms [8]. The manifestations of renal actinomycosis can include a renal abscess, pyonephrosis with renal calcinosis, or necrotizing papillitis. The majority of reported cases have occurred in individuals who have a normal immune system [9].

As the case of our patient, the majority of patients affected by renal actinomycosis are individuals with a normal immune system and no pre-existing medical conditions. They exhibited non-specific clinical symptoms such as abdominal pain, weight loss, fever, weakness, and night sweats, in descending order of frequency. Hematuria and urinary symptoms were less commonly observed in these cases [7]. Biology tests are not particularly useful and lack specificity for diagnosing actinomycosis. However, patients often exhibit a biological inflammatory response with an increase in C- reactive protein levels and an accelerated erythrocyte sedimentation rate. Additionally, an increase in gamma globulin levels has also been reported. In some cases, hyperleukocytosis with a predominance of neutrophils is observed, although this is not always the case. This abnormality was also observed in the patient we examined. The radiological manifestations of actinomycosis are varied and lack specificity, making it difficult to distinguish from malignant tumours. Nevertheless, radiological examinations play a crucial role in diagnosing and assessing the extent of the infection, identifying potential complications, and monitoring the efficacy of treatment [7]. The CT scan can reveal a bulky tumour that is heterogeneous in texture and exhibit early enhancement after the injection of contrast material. The tumour spread to nearby structures [8]. There is no definitive test to detect the presence of Actinomyces bacteria, and serological tests are not particularly useful. Culturing the bacteria is a lengthy process that requires anaerobic conditions [8]. The process of isolating and identifying Actinomyces species can be difficult, especially when hindered by factors such as prior antibiotic treatment, improper specimen transportation, insufficient culture conditions, and inadequate incubation periods. Routine culture techniques and typical incubation times may fail to detect Actinomyces species, as they are often delicate and slow to grow, thriving in anaerobic environments. To improve sensitivity, direct Gram-staining is crucial and has been found to be more effective than culture methods [10].

In 1999, Hyldgaard-Jensen and al. reported the case of a 45-year-old patient who underwent an ultrasound guided biopsy for a large multinodular mass of the right kidney, finding the “grains” specific of the Actinomycosis, which has enabled a rapid and appropriate antibiotic therapy [11]. In 2004, Dhanani and al. described the case of a 64-year-old man presenting a

heterogeneous right flank mass containing air-fluid levels, and an inflammatory reaction involving the right colon and psoas muscle in the CT scan. An empirical antibiotic therapy was prescribed and the repeated CT showed decreased size and inflammation surrounding the mass. The central location of the residual mass imposed a fine needle aspiration showing the « sulfur granules » with no evidence of an urothelial malignancy [12]. However, in many cases, the diagnosis wasn't straightforward and nephrectomy was performed [7,13,14].

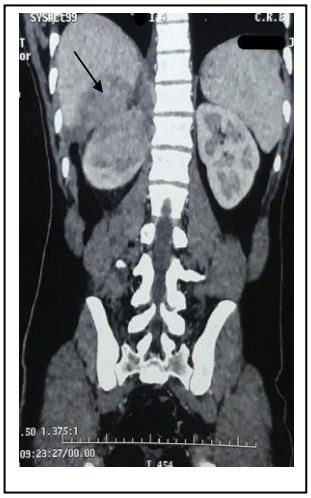

Figure 1: *Abdominal CT scan showing an upper polar renal tissue mass invading the right adrenal gland and the lower border of the liver (arrow).*

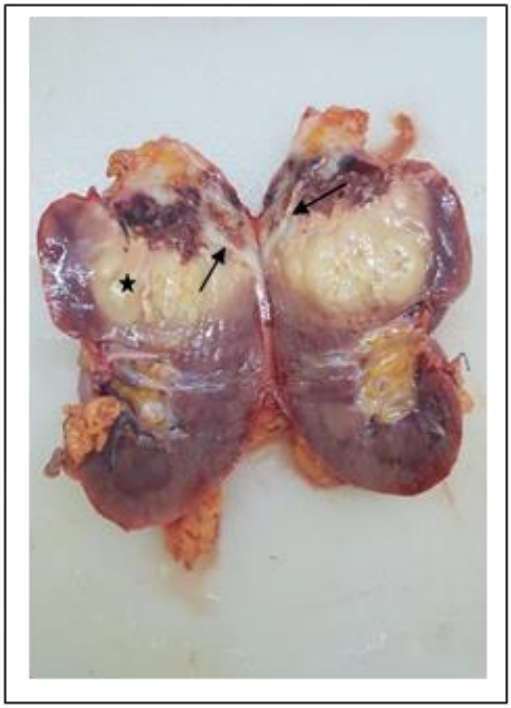

Figure 2: *Nephrectomy with adrenalectomy specimen (macroscopic aspect): The upper renal pole is dissociated by a voluminous lesion of pseudotumor appearance (star) with fistula (arrow).*

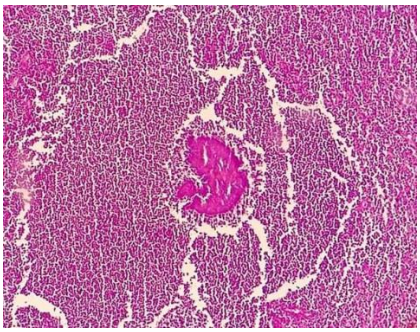

Figure 3: *Microscopic appearance of renal actinomycosis with actinomycotic filaments within a granuloma (PAS coloration, medium power view).*

On the treatment of renal actinomycosis, antibiotic therapy is the rule. Two principles of antibiotic therapy for actinomycosis have been widely applied for decades: high doses and prolonged duration of antibiotics. They are explained by the fact that the actinomycosis follicle is surrounded by a poorly vascularized zone of fibrosis, which impedes antibiotics. Similarly, antibiotic penetration is reduced in necrotic and scar tissue [15]. Optimal tissue concentrations are then difficult to achieve. This is why it is necessary to prolong the duration of antibiotic therapy, in high doses, in order to treat existing foci and avoid recurrences. Curative treatment of this infection is based on antibiotic therapy with penicillin G for a period ranging from one month after disappearance of symptomatic symptoms, to 12 months. Other antibiotics are also effective: ampicillin, tetracyclines, clindamycin, chlorampenicol and rifampicin [8].

Conclusions

Renal actinomycosis is a rare condition characterized by a gradual progression, often resulting in the identification of large masses with extension and inflammation of nearby tissues. In cases where imaging does not exhibit typical features of renal cell carcinoma, it is advisable to consider ultrasound-guided biopsies to avoid unnecessary surgical interventions. However, for locally advanced or pseudotumoral forms, surgical intervention may be necessary. If medical treatment alone is pursued, it should be administered for an extended period, and regular abdominal CT scans are essential to monitor the regression of the infection.

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