Systemic mucormycosis revealed by a renal location: case report.

Ahlem Trifi, Sami Abdellatif, Salah Ben Lakhal

Abstract—Systemic mucormycosis (SM) is a rare opportunistic infection caused by Mucorales. It is a fatal infection if not treated early. Its beginning by a renal location is exceptional. We report a real case of a diabetic woman with a SM revealed by an acute pyonephrosis. The evolution was marked by the dissemination of infection to the brain. The management was based on amphotericin B and surgical debridement with a fatal issue. We conclude that the SM may initiate by an atypical form and its later detection and treatment were the main factor of unfavourable outcome.

Index Terms— Amphotericin B, cerebrovascular accident, Mucorales, Pyonephrosis, pansinusitis, systemic mucormycosis

1 INTRODUCTION

MUCORMYCOSIS is a rare opportunistic infection caused by filamentous fungi of Mucorales. Currently, mucormycosis constitute the third invasive fungal infection after candidiasis and aspergillosis [1]. The rhino-orbito-cerebral and pulmonary forms are the two clinical forms mainly described in literature. It is called systemic mucormycosis (SM) when it reaches at least two non-contiguous organs. SM appears mainly in immunocompromised and usually it is started by the nose and sinus or lung. But it can begin from any other infectious site [2]. The main mechanism of dissemination is the haematogenous route. The clinical and radiological features are not specific [3]. When it is a disseminated form, the most commonly affected organs are: brain, spleen, heart, kidneys, liver and digestive tract. SM remains rare with a constant mortality if it is not treated earlier [2]. The isolated renal mucormycosis is a rare manifestation which is generally confirmed by autopsy [2].

We report a case of a 43-year-old diabetic woman, presenting with SM revealed by a renal location. She was treated by amphotericin B and surgical debridement with a fatal evolution.

This observation provides an opportunity to recall clinical, histo-pathological, imaging and therapeutic aspects of systemic mucormycosis which began by an atypical location.

2 PATIENT AND OBSERVATION

A 43-year-old woman who has as underlying diseases: Diabetes requiring insulin therapy and hypertension, admitted in urology unit for acute pyelonephritis. The clinical history started since 9 days before her admission by a lumbar pain with fever and troubled urine. The biological analyzes showed an inflammatory syndrome with acute renal failure (leukocytosis 24000/mm3, CRP 360 mg/l, urea: 16 mmol/l, creatinine: 190 umol/l), arterial blood gases: metabolic acidosis with an elevated anion gap. The initial management associated antibiotic therapy with cefotaxime, gentamicin and metronidazole, fluid resuscitation and insulin.

The CT urography at day 3 of admission showed a left renal hypertrophy with a heterogeneous mass (Fig. 1).

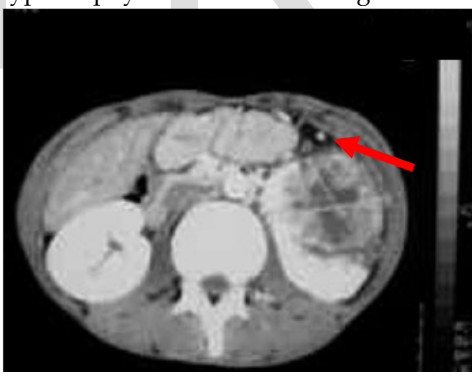

Fig. 1. CT urography: left renal hypertrophy with heterogeneous solid mass of the left kidney, intensifying after contrast injection (Red arrow). The right kidney is undamaged.

Therefore a dual probe J has set up and simultaneously, the bacteriological and histological samples were performed. The evolution was unfavourable, with occurrence of shock and coma after 48 hours. In the cerebral TDM: ischemic accident of the brainstem.

Thus, she was admitted in the intensive care unit (ICU) and the management required invasive ventilation, vasopressors and hydro electrolytic resuscitation. At day 12 of ICU hospitalisation, she presented a palpebral oedema

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extended to the hemiface associated with cutaneous erosion and a hemorrhagic chemosis (Fig. 2).

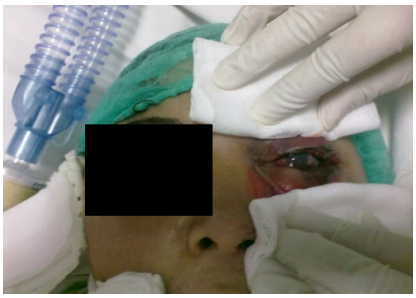

Fig. 2. Hemorrhagic oedema of the left eye extended to the hemiface, conjuntival chemosis and palpebral ptosis.

At this moment a mucorale infection has been suspected given the failure of an anti bacterial treatment on decompensate diabetes. Therefore, amphotericin B was started with surgical debridement. Simultaneously, the fungal samples and biopsy of necrotic skin tissues were performed. Direct mycological examinations of cutaneous necrotic tissue, sinus aspiration and urine have detected mucorales filaments. Likewise, biopsies of facial skin and renal mass fragments confirmed the presence of mycelial filaments.

The evolution was characterized by the occurrence 3 days after of bilateral mydriasis and abolition of brain stem reflexes. Brain Magnetic resonance imaging (MRI) showed an extensive orbital cellulitis with pansinusitis and vast ischemia of the brainstem. The death occurred 48 hours later in a context of a refractory multi organ failure (Fig. 2

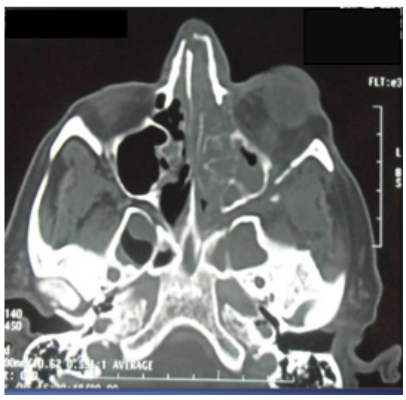

Fig. 3. Cerebral MRI with gadolinium: left orbital cellulitis, pansinusitis and vast ischemia of the brainstem.

3 DISCUSSION

Mucormycosis or zygomycosis is an uncommon, opportunistic and aggressive fatal fungal infection caused by fungi of the order *Mucorales*. It affects with predilection the immunocompromised patients, and mainly the uncontrolled diabetics, which is the most common predisposing factor particularly when it is combined with ketoacidosis [4], [5], [6]. The rhinocerebral mucormycosis is the most frequent location followed by the lung mucormycosis.

Systemic mucormycosis (SM) is retained when the mucorales infection reached, at least, two non-contiguous organs. It remains a rare infection that its beginning by a renal location is exceptionally.

The direct hematogenic route is the most described mode of infestation for disseminated forms. The mechanism would be link to the invasion of vessels, better source of oxygen. That lead to a thrombosis vascular arterial with ischemia or infarct of the infected organ. In our observation, invasive mucormycosis occurred in diabetic patient with ketoacodosis and rapidly complicated by an extended ischemia of the brain stem.

No clinical or imaging signs seem specific of the renal mucomycosis. The first symptom in our case was the lumbar pain as any acute pyelonephritis. The orbital invasion is easily detected by a periorbital oedema, quickly complicating of an ophtalmoplegia, a chemosis and a decline of vision which can lead to blindness. Once the brain is affected the prognosis becomes poor [4], [7], [8].

The definitive diagnosis of mucormycosis is the histopathology exam with detection of non-septate and hyphae mycelia, having a ramified angle [4], [6], [7], [8].

The management protocol of SM includes the control of the predisposing factors, aggressive surgical debridement, and systematic administration of antifungal therapy. Amphotericin B remains the most active molecule against *mucorales*. Hyperbaric oxygen and statins can be used as adjunctive treatments [9], [10], [11]. In case of renal mucormycosis, amphotericin B should be combined to nephrectomy.

In our case, we have administered amphotericin B with surgical debridement of necrotic tissues of the hemiface and sinus. The nephrectomy was not performed for precarious hemodynamic status.

The mortality rates were 24% in rhino-orbital cases and 62% in rhino-cerebral cases [4,7,8]. It is largely demonstrated that a later surgical intervention worsens the prognosis [4], [5], [6], [7], [8], [9]. Isolated and unilateral renal mucormycosis seems to have a better prognosis than the bilateral forms or SM. These have a mortality approaching 100% due to discharge toxins from necrotic tissues and multiple organ failure, mainly if delayed or no treatment [2]. In our case, the late delay in diagnosis, given the

atypical starting location, and consequently the delayed treatment were the main factors in cause of fatal outcome.

4 Conclusion

We have presented an exceptional and atypical form of systemic mucormycosis that beginning by a renal location. The difficult diagnosis and delayed specific management have led to the dissemination of mucorales with a vast cerebral ischemia and multi organ failure. Systemic mucormycosis, although it is a rare entity, must be evoked, diagnosed and treated precociously in case of worsening and necrotizing infection in immuno-compromised patients and this regardless of its starting point.

5 End Sections

5.1 Competing interests

The authors declare no competing interest.

5.2 Conflict of Interest: On behalf of all authors, the corresponding author states that there is no conflict of interest.

5.3 Ethic status: We have obtained a written and signed consent to publish the case report from the husband of the patient.

5.4 AUTHOR'S CONTRIBUTIONS:

- AT analyzed and interpreted the data and drafted the manuscript.
- SA and SBL corrected with critical revision of the manuscript.

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