Open Access Library Journal
2024, Volume 11, e12526
ISSN Online: 2333-9721
ISSN Print: 2333-9705

Macrophagic Activation Syndrome Complicating Delivery in a Patient with a Triply Scarred Uterus: Case Report

Khalil Zimi[1,2], Anas Elmadani[2], Zahid Hafid[1,2]

[1]Laboratoire Central d'Hématologie, Hopital Militaire d'Instruction Mohamed V, Rabat, Morocco
[2]Faculté de Médecine et de Pharmacie de Rabat, Rabat, Morocco
Email: khalil_zimi@um5.ac.ma

How to cite this paper: Zimi, K., Elmadani, A. and Hafid, Z. (2024) Macrophagic Activation Syndrome Complicating Delivery in a Patient with a Triply Scarred Uterus: Case Report. *Open Access Library Journal*, **11**: e12526.
https://doi.org/10.4236/oalib.1112526

Received: October 26, 2024
Accepted: December 3, 2024
Published: December 6, 2024

Abstract

Macrophage Activation Syndrome (MAS), also known as hemophagocytic syndrome, is a rare and severe condition characterized by excessive activation of macrophages in the bone marrow and lymphoid organs, leading to hemophagocytosis and hypercytokinemia. MAS can be primary, primarily affecting children with hereditary immune disorders, or secondary, triggered by infections, malignancies, or autoimmune diseases. We report a case of secondary MAS that developed post-delivery in a 40-year-old multiparous woman with a triply scarred uterus. Complications, including ventilator-associated pneumonia caused by Stenotrophomonas maltophilia and a urinary tract infection caused by Klebsiella pneumoniae, exacerbated her condition. Histological confirmation of hemophagocytosis established the diagnosis of MAS. Despite intensive treatment, the patient ultimately succumbed to sepsis. This case underscores the severity of MAS in obstetric settings, often triggered by infections, and highlights the importance of early diagnosis and management to improve prognosis.

Subject Areas

Hematology, Infectious Diseases

Keywords

Macrophagic Activation Syndrome, Obstetric Complications, Hemophagocytosis, Multidrug-Resistant Infections, Early Diagnosis

1. Introduction

Macrophagic activation syndrome (MAS), also known as hemophagocytic

syndrome, is a rare condition with a severe prognosis. Its diagnosis is based on a combination of clinical and biological signs, which are often non-specific and require cytological or histological testing for hemophagocytosis, along with a thorough etiological investigation. Two main nosological categories have been identified: primary MAS, which encompasses hereditary immune system disorders associated with the activation of T lymphocytes and macrophages, primarily affecting newborns and infants with a family history. In contrast, secondary MAS occurs without a family history and typically affects older children or adults, often triggered by infections (such as viral, bacterial, or parasitic infections), malignancies, autoimmune diseases, or other inflammatory conditions, as highlighted in the literature. Reactive MAS was first described by Risdall and colleagues in 1979, who reported an uncontrolled proliferation of non-malignant histiocytes with increased hemophagocytic activity [1]. We present a case of secondary MAS that developed after delivery in a patient with a triply scarred uterus.

2. Case Study

A 40-year-old multiparous woman (G4P4) with a history of gestational diabetes was admitted to the ICU for post-anoxic encephalopathy following challenging intubation during an emergency caesarean section due to a triply scarred uterus. During her ICU stay, she developed acute ventilator-associated pneumonia caused by Stenotrophomonas maltophilia and a urinary tract infection due to Klebsiella pneumoniae. She was initially treated with Ceftazidime (10 days) and Amikacin (5 days), followed by Tienam and Amikacin, resulting in some clinical improvement.

The patient remained in a vegetative state, with no verbal response, no reaction to pain, and a Glasgow Coma Scale score of 6. A febrile episode with hyperleukocytosis led to blood cultures, which identified ampicillin-resistant Enterococcus faecalis. A concurrent haematological work-up revealed bicytopenia, with anaemia (7.9 g/dL) and thrombocytopenia (96 G/L). Biochemical analysis indicated the presence of liver cytolysis (ALT 109 IU/L, AST 156 IU/L), hypertriglyceridemia (3.58 g/L), hyperferritinemia (1018.46 ng/mL), and elevated CRP (211.8 mg/L).

The bone marrow biopsy revealed a hypercellular marrow with multilineage dysplasia and numerous activated macrophages exhibiting hemophagocytosis (**Figure 1**).

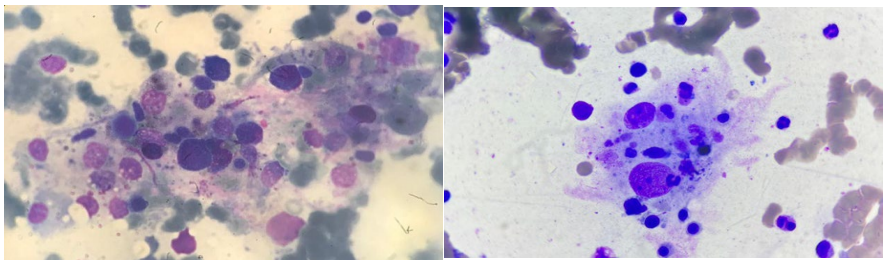

Figure 1. Images of hemophagocytosis on the lens x100.

These findings, when considered alongside the clinical and biochemical data, led to the conclusion that the patient was suffering from macrophagic activation syndrome (MAS). Despite adjusting the antibiotic therapy to Targocid 400 mg/24 h, the patient's condition continued to deteriorate, ultimately leading to the onset of sepsis and subsequent demise.

3. Discussion

Secondary Macrophagic Activation Syndrome is a systemic inflammatory response that arises from the uncontrolled activation of macrophages and T lymphocytes. The condition presents with a range of symptoms, including fever, malaise, organomegaly, neurological manifestations, and gastrointestinal or respiratory issues. Cytopenia, particularly thrombocytopenia in 90% of cases, and anaemia, often requiring transfusions, are the most notable features. Further laboratory findings include hypertriglyceridemia, elevated LDH, hepatic cytolysis, and hyperferritinemia, with levels potentially reaching as high as 400,000 ng/mL [2]. It is often the case that MAS is associated with autoimmune diseases, such as systemic lupus erythematosus (SLE), and haematological malignancies like lymphoma [3]-[5]. While uncommon, MAS can also originate from solid tumours, particularly lung cancers, and infections such as Epstein-Barr virus (EBV) [2] [6] [7] and Leishmania donovani, with mycobacteria and Salmonella being common bacterial triggers [8].

In the field of obstetrics, MAS is a rare but documented complication, often associated with infections, severe preeclampsia, HELLP syndrome, or autoimmune conditions that are exacerbated by pregnancy [9]. It is important to note that pregnancy itself induces immunological changes, which are designed to protect the fetus. However, these changes can also increase vulnerability to severe infections that may provoke immune complications like MAS [10]. In this case study, we present a rare instance of MAS occurring during pregnancy, which was further complicated by intraoperative challenges and ampicillin-resistant Enterococcus faecalis septicemia. This combination of factors is rarely reported in the medical literature [11]. The combination of these factors, particularly the septicemia, triggered MAS, which, to the best of our knowledge, has rarely been documented in the literature.

This case study provides valuable insights into the complex nature of MAS, particularly in the context of obstetric patients. It demonstrates the challenge of distinguishing between septic shock and MAS, as both conditions can manifest with symptoms such as respiratory and neurological distress. The delay in diagnosis, coupled with the deterioration of biological markers [12], may have contributed to the deterioration of the patient's condition and eventual mortality.

This emphasises the need for prompt recognition of MAS in the context of severe infections. It is worth noting that this case study offers valuable insights into the management of MAS in the obstetric population, particularly in instances where it is triggered by resistant infections like Enterococcus faecalis and

compounded by surgical complications. Due to the low prevalence of MAS in obstetric patients, this case study highlights the necessity for prompt recognition and a multidisciplinary approach to management. This should include addressing the underlying infection while considering the initiation of immunosuppressive therapies. It would be beneficial for future research to focus on improving diagnostic timelines and treatment protocols with the aim of reducing the high mortality associated with MAS in pregnant women, particularly in settings with multidrug-resistant infections.

4. Conclusion

Macrophagic Activation Syndrome (MAS) is a rare but severe complication that can arise in obstetric settings, often triggered by severe infections or autoimmune exacerbations during pregnancy. This case underscores the critical need for early diagnosis and prompt management, particularly in addressing underlying infections and initiating immunosuppressive therapies. While MAS presents significant challenges, particularly with multidrug-resistant infections and multiorgan failure, timely intervention can improve outcomes. Future research should focus on refining treatment protocols and early detection strategies to reduce the high mortality associated with MAS in pregnant patients.

Conflicts of Interest

The authors declare no conflicts of interest.

References

[1] Risdall, R.J., McKenna, R.W., Nesbit, M.E., Krivit, W., Balfour, H.H., Simmons, R.L., *et al.* (1979) Virus-Associated Hemophagocytic Syndromea Benign Histiocytic Proliferation Distinct from Malignant Histiocytosis. *Cancer*, **44**, 993-1002. https://doi.org/10.1002/1097-0142(197909)44:3<993::aid-cncr2820440329>3.0.co;2-5

[2] Papo, T. (2000) Guy Gorochov and Thomas Papo Immunologie Inter Med Collect. Groupe Liaisons, 175-186.

[3] Imashuku, S., Hibi, S., Sako, M., Lin, Y., Ikuta, K., Nakata, Y., *et al.* (2000) Hemophagocytosis by Leukemic Blasts in 7 Acute Myeloid Leukemia Cases with T (16; 21) (p11; q22). *Cancer*, **88**, 1970-1975. https://doi.org/10.1002/(sici)1097-0142(20000415)88:8<1970::aid-cncr28>3.0.co;2-9

[4] Molad, Y., Stark, P., Prokocimer, M., Joshua, H., Pinkhas, J. and Sidi, Y. (1991) Hemophagocytosis by Small Cell Lung Carcinoma. *American Journal of Hematology*, **36**, 154-156. https://doi.org/10.1002/ajh.2830360218

[5] Franco Sorolla, J.M., Munoz y Fernandez, J.R., Vidal Fernandez, A.I., Valer Corellano, J., Ramos Paesa, C., Garcia Aranda, A., *et al.* (1990) Hemophagocytosis and Undifferentiated Carcinoma of the Lung. *Revista Clínica Española*, **186**, 440-443.

[6] Zaharopoulos, P. (2001) Serous Fluid Cytology as a Means of Detecting Hemophagocytosis in Epstein-Barr Virus-Induced Autoimmune Hemolytic Anemia. *Diagnostic Cytopathology*, **25**, 248-252. https://doi.org/10.1002/dc.2048

[7] Faurschou, M., Nielsen, O.J., Hansen, P.B., Juhl, B.R. and Hasselbalch, H. (1999) Fatal

Virus-Associated Hemophagocytic Syndrome Associated with Coexistent Chronic Active Hepatitis B and Acute Hepatitis C Virus Infection. *American Journal of Hematology*, **61**, 135-138. https://doi.org/10.1002/(sici)1096-8652(199906)61:2<135::aid-ajh11>3.0.co;2-e

[8] Nau, G.J., Richmond, J.F.L., Schlesinger, A., Jennings, E.G., Lander, E.S. and Young, R.A. (2002) Human Macrophage Activation Programs Induced by Bacterial Pathogens. *Proceedings of the National Academy of Sciences*, **99**, 1503-1508. https://doi.org/10.1073/pnas.022649799

[9] Boutros, J., *et al.* (2020) Pregnancy-Associated Hemophagocytic Syndrome: A Systematic Review of the Literature. *Journal of Obstetrics and Gynecology*, **41**, 1-9.

[10] Mor, G. and Cardenas, I. (2010) Review Article: The Immune System in Pregnancy: A Unique Complexity. *American Journal of Reproductive Immunology*, **63**, 425-433. https://doi.org/10.1111/j.1600-0897.2010.00836.x

[11] Hara, T., Honjo, S., Miyazaki, C., Mizuno, Y., Suda, M., Yamasaki, T., *et al.* (1989) Histiocytic Hemophagocytosis in the Bone Marrow in Children with Sepsis and Disseminated Intravascular Coagulation. *Pediatrics International*, **31**, 335-339. https://doi.org/10.1111/j.1442-200x.1989.tb01310.x

[12] Karras, A. and Hermine, O. (2002) Syndrome d'activation macrophagique. *La Revue de Médecine Interne*, **23**, 768-778. https://doi.org/10.1016/s0248-8663(02)00673-2