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A Case Report of Post Partum Disseminated Intravascular Coagulation Causing Cerebral Microbleeds

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Abstract: ***Disseminated intravascular coagulation (DIC) is a clinical condition caused by various aetiologies and characterized by systemic activation of blood coagulation, leading to vessel thrombosis, organ dysfunction, and severe bleeding.1DIC represents a life - threatening condition that is the endpoint of uncontrolled systemic activation of blood coagulation. Once it enters the stage of malignant DIC, the patient's death becomes unavoidable. We present an atypical fatal case of multiple cerebral microbleeds secondary to disseminated intravascular coagulation in a post - partum lady. The patient was underwent a caesarean section and developed DIC immediately post delivery, and consequently a rare complication of multiple cerebral microbleeds. Patient developed multiorgan failure including respiratory arrest, for which she was ventilated. However, after a few days on the ventilator, she succumbed to these complications of Post - Partum DIC. This article emphasizes on the rare complication of cerebral microbleeds due to post - partum DIC and prompt management of DIC to avoid mortality.***

Keywords: Disseminated intravascular coagulation, post - partum haemorrhage, cerebral microbleeds, s epsis, susceptibility weighted MRI, post partum complications.

1. Introduction

DIC invariably manifests as a secondary disorder, frequently linked to postpartum haemorrhage, and complications during pregnancy and post - partum period which includes hypertensive disorders, abruptio placenta, acute fatty liver of pregnancy, sepsis, and amniotic fluid embolism (AFE).[2] Complications during pregnancy or in the postpartum period can be life - threatening, which includes DIC.[3] Uterine atony related DIC commonly manifests as Post partum haemorrhage (PPH) and one of the primary indications for Caesarean hysterectomy.[4] The uterus needs to be closely observed to ensure that it remains contracted, as it may become intractably atonic any time and might require hysterectomy.[5] DIC enhances the risk of organ failure with mortality rates soaring to 80% in severe disease.[6] The conditions most commonly associated with cerebral microbleeds are small - vessel diseases, including hypertensive arteriopathy and cerebral amyloidangiopathy.[7, 8] Less frequent causes include moyamoya disease, cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy (CADASIL), posterior reversible encephalopathy syndrome (PRES), and radiotherapy induced lesions.[8]

2. Case Report

A 33 years old female was admitted in Shree Narayana hospital casualty, Raipur, Chhattisgarh in January 2025, with breathlessness and generalised weakness since few hours. On elucidation of medical history, patient was operated on same day, about 12 hours previous to admission, in other hospital and was delivered by emergency caesarean section. It was a primigravida and term alive pregnancy, which was delivered by emergency caesarean section. The patient had a known sickle cell trait and moderate anaemia. In vitals, patient had mild hypotension and mild tachycardia. Patient was immediately shifted to ICU and relevant lab investigations were done. The Patient experienced severe post - partum haemorrhage necessitating an emergent hysterectomy. Lab investigations reports supported sepsis and patient had septic shock post hysterectomy. She developed severe respiratory distress after 2 days and for which she was put on ventilator. Further, patient went into multiorgan dysfunction with deranged liver and renal functions tests. All standard medications and management of sepsis and DIC was given with utmost focus on vital parameters and repeated lab reports round the clock. Despite all care, unfortunately patient died on 5th day after admission. A non - contrast CT was performed on 5th day post admission, which revealed multiple areas of bilateral cerebral haemorrhages, including corpus callosum (Figure 1). On 6th day post admission, MRI brain was performed on 1.5T MRI machine, which detected extensive multiple microbleeds in both deep matter and cerebrum bilaterally, also including extensive microbleeds in corpus callosum, in SWI sequences. Figure 1 and 2 demonstrates the cerebral microbleeds in non - contrast CT scan and SWI - MRI sequences respectively.

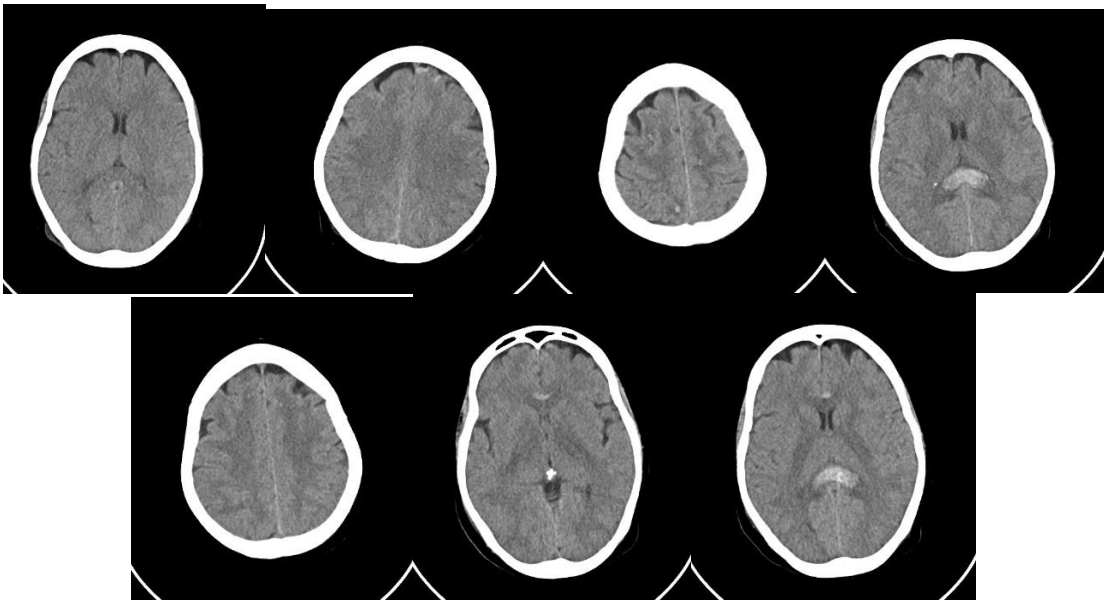

Figure 1: Non - Contrast CT Brain demonstrates multiple areas of bilateral cerebral acute intracranial heamorrhages including corpus callosum

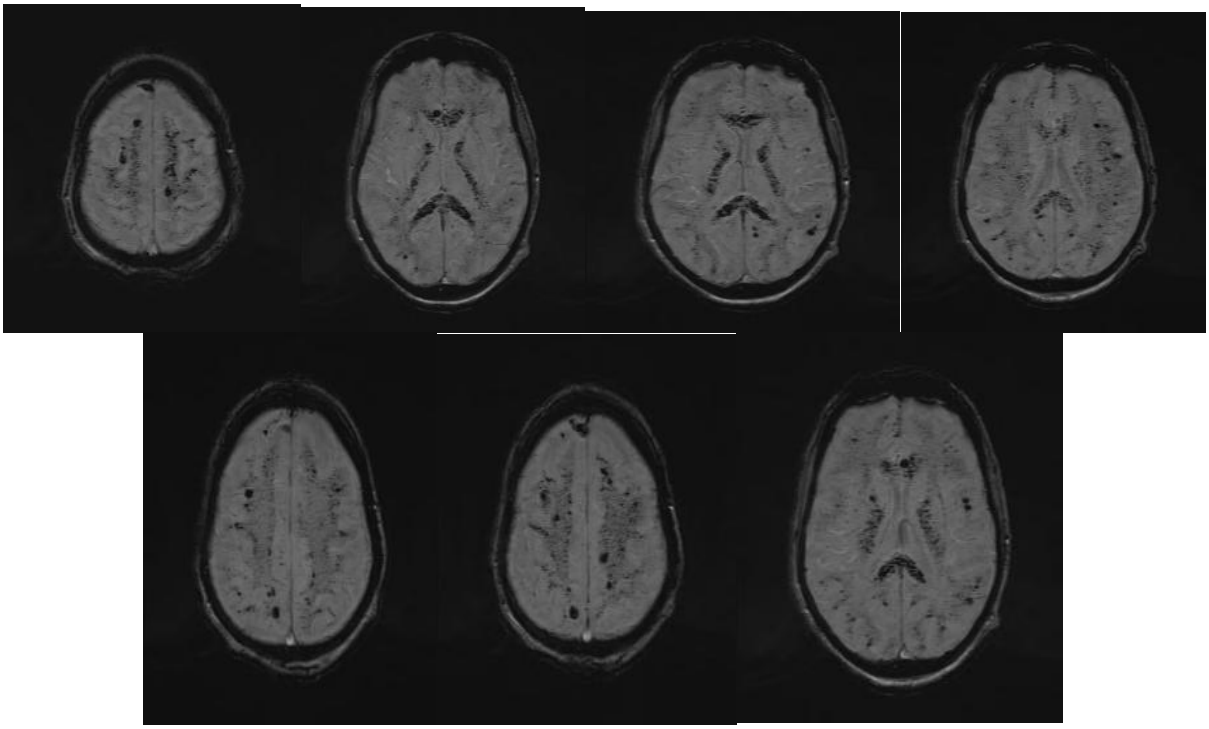

Figure 2: Susceptibility weighted MRI sequence images (SW - MRI) demonstrate extensive dots like microbleeds in bilateral cerebrum including corpus callosum.

3. Discussion

Cerebral microbleeds (MBs) are defined as small perivascular hemosiderin deposits, which are small, round or ovoid lesions of the cerebral parenchyma of low signal intensity on T2* - weighted and Gradient echo (GRE) magnetic resonance imaging (MRI) sequences, with a maximal diameter of 5–10 mm.[9, 10] MRI technique also has shown influence in visualization of MBs like 1.5 Tesla or 3T MRI, Gradient echo T2* imaging or the SWI, 3D acquisition of sub - millimeter spatial resolution with flow compensation, thinner sections (<5 mm), longer echo time (TE) /repetition time (TR), parallel imaging technique, and use of phase map in SWI and they are now part of standard sequence to improve the detection of MBs.[11 - 14] Previous studies have reported similar brain lesions associated with critical illness, such as respiratory insufficiency, infectious encephalitis, and sickle cell disease.[15] However, in most cases clinical and laboratory findings indicate DIC, which suggests a shared underlying mechanism. It should be noted that hypoxaemia is also common in these situations, and may be underlying cause in the development of bleeding. Hypoxia initiates a cascade of chemical effects in the blood - brain barrier, causing its increased permeability, leading to blood extravasation.[16] Air and fat embolisms share some MRI appearance.[16] However, fat embolism typically presents with diffusion restriction on brain MRI studies, which was not observed in our patient.

Haemorrhage, especially post - partum is one of the major causes for DIC in pregnancy and post - partum. Classically related to PPH, this type of consumption coagulopathy is a complication of uterine atony or rupture, retained placenta or membranes, placenta accreta, or severe lacerations of the birth canal (cervical or vaginal). The characteristics of the DIC developing in these cases are the rapid maternal loss of a large blood volume along with its coagulation factors, resulting in patients who are hemodynamically compromised.

4. Conclusion

In conclusion, systemic conditions which can cause DIC may occasionally be associated with presence of cerebral microbleeds. SWI MRI sequences are an appropriate tool for detecting and correctly evaluating blood products in cerebral microbleeds. The patient's clinical finding, medical history and laboratory findings should guide differential diagnosis. Prompt management of DIC should be done to avoid mortality.

References

[1] Taylor FB Jr, Toh CH, Hoots WK, Wada H, Levi M, Scientific Subcommittee on Disseminated Intravascular Coagulation (DIC) of the International Society on Thrombosis and Haemostasis (ISTH). Towards definition, clinical and laboratory criteria, and a scoring system for disseminated intravascular coagulation. Thromb Haemost.2001; 86 (5): 1327 - 30.

[2] Zhao ZL, Zhang JX, Li N, Yao GQ, Zhao YY, Li SL, et al. Disseminated intravascular coagulation associated organ failure in obstetric patients admitted to intensive care units: a multicenter study in China. Sci Rep.2021; 11 (1): 16379.

[3] Richa F, Karim N, Yazbeck P. Obstetric admissions to the intensive care unit: an eight - year review. Lebanese Med J.2008; 56 (4): 215 - 9.

[4] Ahonen J, Jokela R. Recombinant factor VIIa for life - threatening post - partum haemorrhage. Br J Anaesth.2005; 94: 592 - 5.

[5] Oyelese Y and Ananth CV. Placental abruption. Obstet Gynecol.2006; 108 (4): 1005 - 16.

[6] Sporer SM, Callaghan JJ. Fatality from disseminated intravascular coagulation complicating total hip arthroplasty: a case report. The Iowa Orthop J.1997; 17: 53 - 7.

[7] Greenberg SM. Small vessels, big problems. N Engl J Med.2006; 354: 1451—3.

[8] Charidimou A, Krishnan A, Werring D, Rolf Jäger H. Cerebral microbleeds: a guide to detection and clinical relevance in different disease settings. Neuroradiology.2013; 55: 655—74.

[9] Fazekas F, Kleinert R, Roob G, Kleinert G, Kapeller P, Schmidt R, *et al*. Histopathologic analysis of foci of signal loss on gradient - echo T2* - weighted MR images in patients with spontaneous intracerebral hemorrhage: Evidence of microangiopathy - related microbleeds. AJNR Am J Neuroradiol1999; 20: 637 - 42.

[10] Greenberg SM, Vernooij MW, Cordonnier C, Viswanathan A, Al - Shahi Salman R, Warach S, *et al*. Cerebral microbleeds: A guide to detection and interpretation. Lancet Neurol 2009; 8: 165 - 74.

[11] Nandigam RN, Viswanathan A, Delgado P, Skehan ME, Smith EE, Rosand J, *et al*. MR imaging detection of cerebral microbleeds: Effect of susceptibility - weighted imaging, section thickness, and field strength. AJNR Am J Neuroradiol 2009; 30: 338 - 43.

[12] Goos JD, van der Flier WM, Knol DL, Pouwels PJ, Scheltens P, Barkhof F, *et al*. Clinical relevance of improved microbleed detection by susceptibility - weighted magnetic resonance imaging. Stroke 2011; 42: 1894 - 900.

[13] Puy L, Pasi M, Rodrigues M, Van Veluw SJ, Tsivgoulis G, Shoamanesh A, *et al*. Cerebral microbleeds: from depiction to interpretation. J Neurol Neurosurg Psychiatry 2021; 92: 598 - 607.

[14] Wu Z, Mittal S, Kish K, Yu Y, Hu J, Haacke EM. Identification of calcification with MRI using susceptibility - weighted imaging: A case study. J Magn Reson Imaging 2009; 29: 177 - 82.

[15] Neligan A, Rajakulendran S, Nortley R, Manji H. Extensive cerebral microhemorrhages caused by acute disseminated intravascular coagulation secondary to sepsis. JAMA Neurol. 2014; 71: 510—1.

[16] Fanou EM, Coutinho JM, Shannon P, Kiehl TM, Levi MM, Wilcox ME, et al. Critical illness - associated cerebral microbleeds. Stroke.2017; 48: 1085—7.