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Case Report

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Breathing Through the Crisis: Anaesthetic Strategies in Molar Pregnancy with Cardiac and Pulmonary Complications

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Abstract

Gestational trophoblastic disease (GTD) represents an unusual complication of pregnancy, often identified as molar pregnancy or hydatidiform mole. GTD is defined by the presence of hydatidiform hydrophilic villi and atypical hyperplastic trophoblast, typically occurring in women of reproductive age. The prevalence of molar pregnancy in Malaysia is 2.6 cases per 1,000 deliveries.2 Molar cells are benign; however, there exists a slight risk of malignant transformation if not completely removed. Molar pregnancies are rare but represent the primary type of gestational trophoblastic disease (GTD). It occurs roughly two times more often in Asian women than in non-Asian women. In severe instances, patients may exhibit complications of molar pregnancy, including cardiorespiratory dysfunction, substantial haemorrhage leading to disseminated intravascular coagulation (DIC), or neurological symptoms such as seizures, which may be linked to metastatic disease. Multiple reports have documented fatalities in postoperative care due to cardiopulmonary distress. The complexities of anaesthetic management include both intraoperative and postoperative care. Present data suggest that severe cases of molar pregnancy with early progression of complications require preoperative intensive care management.

Keywords: ***Hydatidiform mole, Hyperthyroidism, Molar pregnancy, Cardiopulmonary dysfunction, anaesthesia***

Introduction

Gestational trophoblastic disease (GTD) is an atypical complication of pregnancy, commonly known as molar pregnancy. GTD is a condition characterized by hydatidiform hydrophilic villi and atypical hyperplastic trophoblast, observed in women of reproductive age. Around one in every 1945 pregnancies globally are affected, with a higher prevalence in Asian nations [1]. In Malaysia, the incidence of molar pregnancy is 2.6 per 1,000 deliveries. The primary complication of molar pregnancy is thyrotoxicosis, resulting from elevated beta-hCG levels. Acute pulmonary oedema and coronary insufficiency are potential consequences of thyrotoxicosis, which can be life-threatening. The majority of molar pregnancies are benign; but, a small minority may proceed to persistent trophoblastic illness or choriocarcinoma, necessitating urgent therapy. Most cases previously documented intra- and post-operative complications of molar pregnancy evacuation. Here we describe an exceptional instance of molar pregnancy that manifested with cardiopulmonary complications preceding uterine evacuation.

Case Presentation

A 51-year-old Malay woman with no prior medical history presented to our emergency room with complaints of shortness of breath for three days, accompanied by paroxysmal nocturnal dyspnea for the same duration, bilateral leg oedema, abdominal distention, an abdominal mass, and headache for one week. She otherwise denied experiencing fever, nausea, vomiting, diarrhoea, loss of appetite, weight loss, vaginal bleeding, or any familial history of cancer.

Upon arrival at the emergency department, she was alert yet exhibiting tachypnea and dehydration. The patient demonstrated hypertension, presenting with an initial blood pressure of 185/115 mmHg and a heart rate of 125 bpm, along with an electrocardiography confirming sinus tachycardia. The pulse oximetry reading is 92% on ambient air, with a respiratory rate of 34 breaths per minute. The arterial blood gases showed type 2 respiratory failure (PaO2 62mmHg, PaCO2 26mmHg) and metabolic acidosis. Bilateral basal fine crackles were detected on lungs auscultation. Additionally, she had bilateral lower limb pitting oedema extending up to her knee. Her chest X-ray showed upper lobe diversion with bat wings appearance and blunted left cardiophrenic angle. She was supported on non-invasive ventilation, administered intravenous furosemide and intravenous glyceryl trinitrate for blood pressure control. Nonetheless, other investigations yielded unremarkable results: TWC 10, Hb 12.4, platelet 317, urea 2.9, creatinine 67, sodium 139, potassium 3.7, albumin 34, AST 22, ALT 14, ALP 43 and normal coagulation profile. The patient was referred to the medical team and treated for acute pulmonary oedema precipitated by hypertensive emergency.

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Upon further inquiry, she disclosed noticing abdominal mass and has been amenorrhea for the past 4 months. Bedside ultrasonography of the uterus showed a snowstorm appearance. The urine pregnancy test (UPT) yielded a positive result, with Total Human Chorionic Gonadotrophin (hCG) level of 759,331 IU/L. In regards to her past gynaecology history, she attained menarche at the age of 12 years old, with regular menses every 28 days. She was not on any contraception. Her latest childbirth took place 13 years ago. She had successful vaginal deliveries in 2004 and 2011, with a recorded complete miscarriage in 2009. Before her last menstruation, the patient had a six-month period of amenorrhea. A urine pregnancy test was performed, resulting in a negative outcome.

The Gynaecology team reviewed her case and decided to proceed with suction and curettage. The patient was admitted to the ICU for stabilization and preoperative optimization. The thyroid function test validates the diagnosis of transient gestational thyrotoxicosis resulting from molar pregnancy, evidenced by TSH of 0.23 mIU/L and T4 level of 19.76 pmol/L. She was administered an infusion of GTN for blood pressure management and initiated on oral propranolol at a dosage of 40 mg twice daily. The patient underwent surgery under general anaesthesia, which was complicated by bleeding with a total blood loss of 2 litres. She received a 2-pint packed cell transfusion intra-operatively and remained stable without the need for inotropic support. She was transferred back to the ICU for weaning and stabilization following the operation. She was successfully weaned and extubated after two days. She spent three days in the general ward for antihypertensive medication optimization before being discharged home.

Table I: Blood investigation trends

	On admission	Post operation	Discharge to ward	Discharge home	After 2 months	After 3 months
Beta-hCG	759331	2360	358	218	33	4
TSH	0.23	-	-	-	-	-
T4	19	-	-	-	-	-

Abbreviation; B-HCG: Beta-human chorionic gonadotrophin, TSH: thyroid stimulating hormone, T4: thyroxine

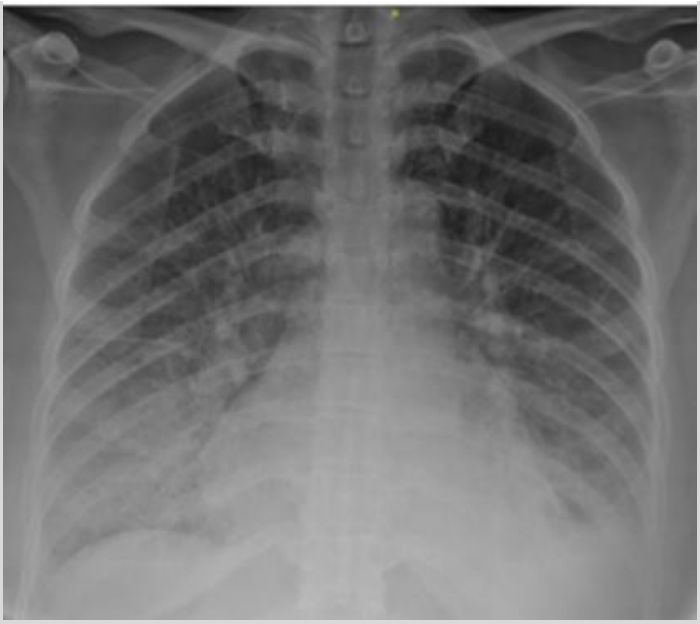

Fig. 1: Chest x-ray upon arrival at ED

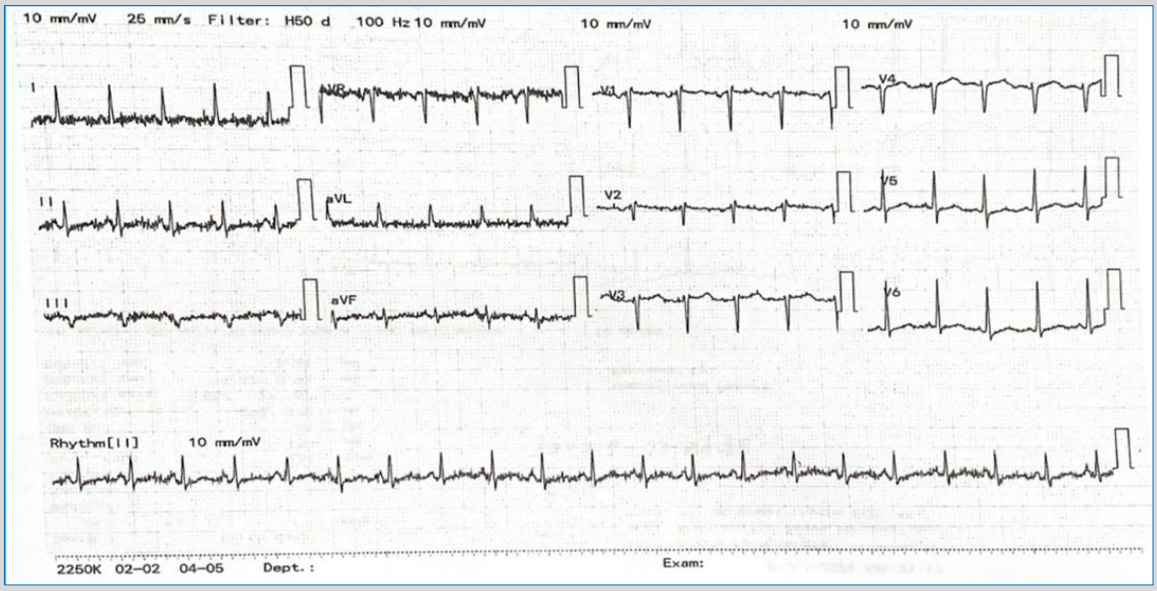

Figure 2: Echocardiogram on presentation showing sinus tachycardia

Discussion

Molar pregnancy is classified as a type of gestational trophoblastic disease (GTD) and is occasionally referred to as hydatidiform mole. It occurs when the fertilization of the ovum by the sperm is erroneous, resulting in the proliferation of aberrant cells or clusters of fluid-filled sacs within the uterus, culminating in either a whole or partial molar pregnancy [1]. The molar cells are non-cancerous; however, they pose a minimal danger of malignant transformation if they are not entirely excised. Molar pregnancies are rare yet constitute the predominant form of GTD. It occurs approximately twice as frequently in Asian women compared to non-Asian women. Risk factors for molar pregnancy include women over 40 years of age, a history of past spontaneous abortions, and a prior occurrence of molar pregnancy. Vaginal bleeding is the most common indicator of molar pregnancy, accompanied by thyrotoxicosis, pre-eclampsia, ovarian theca lutein cysts, hyperemesis gravidarum, and uterine enlargement. In severe cases, patients may present with complications of molar pregnancy, including cardiorespiratory dysfunction, significant haemorrhage resulting in disseminated intravascular coagulation (DIC), or neurological manifestations such as seizures, potentially attributable to metastatic disease [3].

Hyperthyroidism has been observed in the majority of patients with hydatidiform mole. The hyperthyroid condition in GTD cannot be solely attributed to the influence of thyroid-stimulating hormone (TSH) or thyroid-stimulating antibodies, as seen in Graves' disease. The excision of the hydatidiform mole or trophoblastic tumour leads to the swift alleviation of hyperthyroidism. The findings indicate that trophoblastic tissue is the primary source of the thyroid-stimulating agent hCG, which possesses thyrotropic activity and is crucial in mediating hyperthyroidism in GTD. This phenomenon is attributed to "specificity spillover," wherein one hormone engages with the receptor of another hormone, resulting in actions dictated by the nature of the activated receptor. Multiple variables facilitate this "spillover" phenomenon. Firstly, hCG and TSH exhibit structural similarity; hCG comprises a heterodimer formed by two noncovalently linked subunits (alpha and beta). The alpha subunit of hCG closely resembles TSH, whereas its beta subunit is analogous yet distinct enough to confer its biological characteristics. The structural similarities between hCG and TSH enable hCG to activate the TSH receptor on thyroid membranes. Additionally, the likelihood of a clinically significant "spillover effect" is greater during pathological conditions characterised by an excess of the hormone, as observed in GTD. In ordinary pregnancies, the affinity of hCG for the TSH receptor and its thyrotropic efficacy are considered sufficiently low for the "spillover effects" to be significant. Numerous studies have shown that hCG produced by hydatidiform moles and gestational trophoblastic neoplasia exhibits distinct biological features compared to hCG in women with normal pregnancies [4].

The anaesthetic management of these cases presents challenges due to the intraoperative risks associated with thyroid storm and high-output cardiac failure. Numerous anaesthetic techniques have been documented for the management of these patients, including general anaesthesia, spinal anaesthesia, and combined spinal-epidural anaesthesia [5]. A 2007 article documented a case of molar pregnancy associated with hyperthyroidism at 12 weeks of gestation, managed under total intravenous anaesthesia using propofol and remifentanil, along with an esmolol infusion to regulate sympathetic hyperactivity during the surgical procedure [6]. Anaesthesia selection must be tailored to the individual patient. The primary objectives in anaesthetic management are the perioperative prevention of thyrotoxic crisis and the regulation of overt sympathetic responses resulting from hyperthyroidism. Spinal anaesthesia has numerous benefits compared to general anaesthesia. It is non-toxic and safe for individuals with hyperthyroidism. Spinal anaesthesia facilitates the prompt identification of complications such as thyroid storm and cardiorespiratory distress. In patients experiencing active bleeding and severe hypotension, general anaesthesia is favoured to ensure haemodynamic stability. Volatile agents such as halothane, isoflurane, sevoflurane, and desflurane induce uterine relaxation, potentially increasing bleeding risk. Therefore, their use may necessitate lower concentrations. Judicious use of intravenous fluids and blood is essential since patients have potential to develop pulmonary oedema [5].

Cardiopulmonary dysfunction has been highlighted following the excision of benign hydatidiform mole. Acute cardiopulmonary distress occurs in 27% of cases following the evacuation, with a higher incidence in patients whose uterine size is 16 weeks or greater. Symptoms can manifest 4 to 12 hours post-evacuation, exhibiting varying severity and requiring intervention. Clinical signs include cough, tachycardia, tachypnea, hypoxaemia, diffuse rales, and bilateral pulmonary infiltrates observed on chest radiography. Severe respiratory distress may necessitate mechanical ventilation, vasopressor support, and admission to the intensive care unit. In the most critical cases, massive thromboembolic events can result in mortality [1]. In over 50% of cases, the cardiopulmonary crisis has been linked to the embolisation of trophoblastic cells that infiltrate the venous circulation in varying quantities. Yet, the precise cause of cardiopulmonary dysfunction following the evacuation remains ambiguous. An analysis revealed that among 60 cases of benign trophoblastic disease reviewed, five experienced respiratory complications. Two patients experienced pulmonary oedema that advanced to adult respiratory distress syndrome (ARDS) [7]. The pulmonary findings may be attributed to several aetiologies, including trophoblastic emboli, hypervolemia, disseminated intravascular coagulation, and hyperthyroidism. Nonetheless, autopsies of two patients revealed no evidence of pulmonary trophoblastic emboli [8]. Thus far, this catastrophic complication has been addressed solely as a post-evacuation complication [9]. However, 27% of cases of trophoblastic hyperthyroidism can developed severe perioperative complications like acute pulmonary distress, as in our patient [10].

This patient arrived at the emergency department exhibiting hypertensive emergencies in acute respiratory distress. Abdominal distention and a mass were noticed during the examination, with bedside ultrasound indicating molar pregnancy, subsequently confirmed by elevated levels of hCG. She is at risk for molar pregnancy due to her Asian ethnicity, age exceeding 45 years, and a history of complete miscarriage. She was surprised to learn she was pregnant at the age of 51, having believed she had already undergone menopause. The patient was diagnosed with hypertensive emergency complicated with acute pulmonary oedema, necessitating non-invasive ventilator support. She was then admitted to the intensive care unit for pre-operative optimisation. The thyroid function test of this patient indicates a hyperthyroid state, which may be a complication of molar pregnancy. The cardiopulmonary symptoms experienced by the patient could also stem from hyperthyroidism, potentially resulting in cardiac dysfunction and pulmonary oedema.

Conclusion

The complexities of anaesthetic management encompass both intraoperative and postoperative care. However, current evidence

suggests that severe cases of molar pregnancy with early progression of complications necessitate preoperative intensive care management. The primary objectives in anaesthetic care are the prevention of thyrotoxic crisis and the regulation of overt sympathetic responses related to hyperthyroidism. In this case, general anaesthesia was the preferable option due to the patient's existing cardiorespiratory distress.

The exact aetiology of acute pulmonary oedema in this patient was unclear. The cause may be attributed to her undiagnosed hypertension, cardiopulmonary complications arising from the molar pregnancy, or adverse effects associated with hyperthyroidism. An earlier study suggested that cardiopulmonary dysfunction remains uncertain even after the removal of a benign hydatidiform mole. No references have been made concerning the cardiopulmonary complications linked to molar pregnancy prior to the evacuation of the mole. Hyperthyroidism should always be excluded in patients with advanced trophoblastic diseases and preoperative treatment of severe hyperthyroidism with multidisciplinary approach involving anaesthesiologists, obstetricians, and endocrinologists necessary to prevent perioperative complications.

Declaration

Ethics approval and consent to participate

Not applicable

List of abbreviations

GTD: Gestational trophoblastic disease

hCG: human chorionic gonadotrophin

UPT: urine pregnancy test

bpm: beats per minute

mmHg: millimetre of mercury

TWC: total white cell count

Hb: haemoglobin

AST: aspartate aminotransferase

ALT: alanine aminotransferase

ALP: alkaline phosphatase

ICU: intensive care unit

DIC: disseminated intravascular coagulation

TSH: thyroid stimulating hormone

Data Availability

Not applicable

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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Authors' contributions

TNA, NN and BI were involved in patient management. TNA and NN had conceived and drafted the manuscript. NN acts as the corresponding author and revision of manuscript. NS provides expert validation and the discussion accuracy and its rigor for publication. All authors read and approved the final manuscript.

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