

CASE REPORT

A case of heavy menstrual bleeding in an adolescent due to undiagnosed severe hypothyroidism

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Abstract

Heavy menstrual bleeding can be life threatening in both adult and pediatric populations, sometimes requiring emergent resuscitation. Once stabilized, it is important to carefully consider the extensive list of potential causes. Hypothyroidism should be considered in the differential diagnosis of heavy menstrual bleeding. It is important to recognize this early, as hypothyroidism can affect many other body systems, sometimes significantly. This report outlines the case of a 16-year-old female who presented with heavy menstrual bleeding, ultimately determined to be due to severe hypothyroidism. It highlights the importance of investigation, recognition, and treatment of uncommon causes of heavy menstrual bleeding in adolescent patients for pediatricians, emergency physicians, and primary care providers alike.

Introduction

In the adolescent population, the differential diagnosis for heavy menstrual bleeding is wide, including endocrine disorders (e.g. anovulatory bleeding, polycystic ovarian syndrome, thyroid disease), bleeding disorders (e.g. von Willebrand disease, platelet dysfunction, thrombocytopenia, clotting factor deficiencies), infections (e.g. cervicitis), medications (e.g. anticoagulants, depot medroxyprogesterone), trauma, foreign body, pregnancy (e.g. spontaneous abortion, ectopic, gestational trophoblastic disease), and structural uterine disorders (e.g. adenomyosis, myomas, polyps, cancer)¹. Heavy menstrual bleeding in the pediatric population has also been attributed to Van Wyk-Grumbach Syndrome, consisting of chronic hypothyroidism, precocious puberty, delayed bone age and ovarian cysts^{2,3,4}. Despite the wide range of etiologies, the most common cause of heavy menstrual bleeding in adolescents is anovulatory bleeding related to an immature hypothalamic-pituitary-ovarian axis^{1,3}.

Given that heavy menstrual bleeding can be severe and life threatening, it is imperative that after resuscitation, clinicians be able to promptly diagnose and treat the underlying cause. This report outlines the case of a 16-year-old female who presented with life threatening heavy menstrual bleeding and was subsequently diagnosed with severe hypothyroidism as the underlying cause. Hypothyroidism as a cause of heavy menstrual bleeding has been debated⁵, though it has been at-

tributed to pseudoprecocious puberty in children⁶, and may cause a variety of menstrual irregularities in women of reproductive age⁷.

Case Presentation

A 16-year-old female presented to a community emergency department (ED) after three syncopal episodes at home in conjunction with heavy menstrual bleeding. She had undergone menarche five months prior but had no further vaginal bleeding until this presentation. Her initial menses was also heavy; she missed school as a result, but she did not have syncopal episodes. On presentation, she described changing menstrual pads every two hours and passing moderate-sized clots. She denied dysmenorrhea, dyspnea, pedal edema, pleuritic chest pain or skin/nail/hair changes. When asked, she endorsed protracted fatigue, cold intolerance, flat mood and occasional constipation for several years. She did not have symptoms of a bleeding diathesis. There was no family history of autoimmune nor bleeding disorders. She was otherwise healthy, and her only prior surgery was dental work. She was not taking any medications and her immunizations were up to date.

On initial assessment to the community ED, she was normotensive and mildly tachycardic (110 bpm). She weighed 45.5 kg, but due to the nature of her presentation, a height was not obtained. Her lips and conjunctiva were pale, and cardiorespiratory and abdominal exam were unremarkable. She was Tanner Stage II for breast and pubic hair development. No myxedema

or pedal edema was evident. Her mentation was normal, but it was difficult to assess cognition due to the focus on her acute presentation.

Her urine beta-hCG was negative. Her hemoglobin was 64 g/L (normal: 105-150), with no previous for comparison. Her coagulation studies were as follows: platelets $264 \times 10^9/L$ (normal: 130-400), international normalized ratio 1.3 (normal: 0.8-1.2), partial thromboplastin time 27.1 (normal: 22.8-29.5) seconds, and fibrinogen 1.3 (normal: 2.2-5.5) g/L. Liver enzymes, lactate dehydrogenase and renal function tests were normal. Her blood smear was negative for schistocytes. Thyroid and von Willebrand testing were sent. An electrocardiogram showed sinus tachycardia with a non-specific T wave abnormality.

She was fluid resuscitated and received two units of packed red blood cells (pRBCs) in the ED and was then admitted to the medical floor. Gynecology at this peripheral centre was consulted. She was started on tranexamic acid 1g intravenous (IV) q6h and conjugated estrogen (Premarin) 25mg IV q6h for three doses. She was also given medroxyprogesterone acetate (Provera) 20mg PO. A pelvic ultrasound was completed and ruled out a structural abnormality of the uterus and ovaries.

Her heavy menstrual bleeding continued, and repeat hemoglobin was 65 g/L, so she was transfused two more units of pRBCs. Her platelets decreased during the first 48 hours to a nadir of $83 \times 10^9/L$. Hematology at this centre was consulted, and suggested giving DDAVP 13.65mcg IV empirically, as the von Willebrand screen was still pending. She was also transfused with cryoprecipitate and platelets. Her fibrinogen continued to be low (1.9 g/L). During the first 36 hours of admission, she received a total of eight units pRBCs, ten units of cryoprecipitate, one unit of platelets and one dose of DDAVP.

Despite this early management, she continued to experience heavy menstrual bleeding beyond this initial 36 hours. Eventually, she became hypotensive with systolic blood pressure as low as 60 mmHg, though her heart rate remained normal (65-80 bpm). Pediatric Intensive Care and Pediatric Gynecology services at the tertiary care hospital were consulted for management recommendations, transport and monitoring, as despite blood product transfusion and fluid resuscitation, she remained hypotensive. A clear etiology had yet to be established as well. At this point, she was transferred by air to the tertiary care centre's pediatric ED.

Upon arrival, she was persistently bradycardic (40-50 bpm). The remainder of her vital signs were normal. Her vaginal bleeding was minimal. Her initial thyroid studies from the community hospital returned, revealing a thyroid stimulating hormone

(TSH) of 856 (normal: 0.3-5) mIU/L; her free thyroxine (T4) and triiodothyronine (T3) were undetectable. Her von Willebrand testing was negative. She was admitted for monitoring. She was stepped down from IV to oral tranexamic acid and started on continuous combined oral contraceptive pill regimen (two pills, each containing 30 mcg of ethinyl estradiol and 150 mcg of desogestrel, for one week, then one pill daily). Internal Medicine and Endocrinology services were consulted. Her thyroid studies were repeated, with a TSH of 510 mIU/L, free T4 of 2.2 (normal: 11.5-22.7) pmol/L, and anti-thyroid peroxidase (anti-TPO) antibodies 8 (normal: <6) IU/mL. Her thyroid gland was noted to be atrophic on physical examination and subsequently on ultrasound. A chest radiograph was completed and ruled out pleural and pericardial effusions. Her electrocardiogram was repeated, with the non-specific T wave abnormality resolved, but persisting sinus bradycardia.

She was started on levothyroxine 75mcg PO daily and was monitored for an additional 24 hours given the bradycardia; however, she remained clinically stable with minimal vaginal bleeding. She was discharged home four days after presentation and her menstrual bleeding had ceased.

Her follow-up TSH six weeks after discharge was mildly elevated 5.6 mIU/L and her free T4 was 16.6 pmol/L. Her TSH was again repeated three weeks after this and was within the normal range (0.91 mIU/L).

Discussion

This case describes a patient who, on initial presentation, had substantial blood loss requiring significant resuscitative efforts for stabilization. In some cases, heavy menstrual bleeding can cause patients to decompensate to the point of hemorrhagic shock. It is important to recognize this quickly and adequately resuscitate the patient. Many hospitals have massive transfusion protocols in place for cases like this, which includes rapid administration of blood products and tranexamic acid. After initial resuscitation, these cases require careful consideration and interdisciplinary care to determine the underlying cause and treat accordingly. In addition, hormonal therapy to treat anovulatory uterine bleeding is essential to assist with cessation of bleeding. In this case, the discrepancy in the patient's vital signs (bradycardia rather than tachycardia in the setting of hypovolemic hypotension) was an important indicator of her undiagnosed hypothyroidism.

Through the combined efforts of specialists including, Gynecology, Emergency Medicine, Internal Medicine, and Endocrinology, this patient was diagnosed with severe hypothyroidism. Hypothyroidism is a common pediatric endocrine condition and may be either congenital or acquired⁸. In many regions, how-

ever, congenital hypothyroidism has been added to newborn screening programs, and delayed diagnosis of hypothyroidism is becoming less common. Early diagnosis of congenital hypothyroidism is important as if left untreated, it can potentially impair neuro-cognitive development in young children⁹. In women of reproductive age, hypothyroidism has been documented to cause a variety of menstrual irregularities⁷. Hypothyroidism can affect steroid metabolism by altering the binding activity of sex hormone binding globulin, then decreasing the plasma concentrations of testosterone and estradiol, while increasing their unbound, free or biologically active fractions. Furthermore, it can delay the luteinizing hormone response to gonadotropin-releasing hormone. In this case, she had evidence of pubertal delay (Tanner stage 2 at onset of menses) and chronic symptoms of hypothyroidism, which suggests that her hypothyroidism was present for a few years and affected her hypothalamic-pituitary-gonadal axis. These changes can contribute to anovulation, a common cause of heavy menstrual bleeding in adolescents¹. Additionally, hypothyroidism may cause coagulopathies⁷ that can increase bleeding time, activated partial thromboplastin time, activated recalcification time, and clotting time, all of which can also lead to heavy menstrual bleeding¹⁰. The menstrual irregularities associated with severe hypothyroidism typically resolve with thyroid replacement therapy once TSH levels normalize¹¹. It is also important to note that in the pediatric population, rapid treatment of longstanding hypothyroidism is not recommended as there is a risk for behavioural/emotional problems and pseudotumor cerebri, therefore a combination of an oral contraceptive pill and treating the hypothyroidism slowly with a low dose and gradually advancing as tolerated, is suggested¹².

Conclusion

In cases of heavy menstrual bleeding, resuscitation should be initiated immediately to avoid progression to hemorrhagic shock. The underlying cause of the heavy menstrual bleeding should be investigated and diagnosed. Given the broad differential diagnosis of heavy menstrual bleeding in adolescents, diagnosis and treatment may require a multidisciplinary approach. Less common causes of heavy menstrual bleeding in the adolescent population, such as severe hypothyroidism, should be considered, and targeted treatment should begin early but with careful consideration of possible adverse effects.

Consent was obtained from the patient and their legal guardian prior to preparation of this case report.

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