Postabortal Bleeding and Endometrial Cancer: A Diagnostic Dilemma

Beatriz Carmela R. Glorioso, RN, MD and Lylah D. Reyes, MD, MSc, FPOGS

ABSTRACT

Abnormal uterine bleeding after a spontaneous abortion requires a thorough diagnostic work-up to be able to identify the appropriate management. Imaging modalities such as Transvaginal ultrasound with Doppler studies together with physical and laboratory findings are beneficial to narrow the differential diagnoses. There are a number of conditions that may present as endometrial mass with myometrial invasion and increased uterine vascularity including retained products of conception, gestational trophoblastic disease, uterine arteriovenous malformation, placenta accrete syndrome, and a possible endometrial neoplasm. This is a case of a 29-year-old, Gravida 1 Para 0 (0010), with an unexplained postabortal bleeding despite curettage which poses a diagnostic challenge. A consideration of retained products of conception versus a gestational trophoblastic neoplasia on ultrasound were made. She underwent diagnostic hysteroscopy followed by suction curettage and biopsy. The histopathologic result revealed poorly differentiated neoplasm with the considerations of endometrial adenocarcinoma endometrioid pattern and carcinosarcoma (malignant mixed mullerian tumor). Endometrial cancer is rarely associated with pregnancy and less than 5% of cases occurs in women aged less than 40 years old.[6] The concurrence of pregnancy and endometrial cancer is sporadic. It is usually diagnosed in the first trimester after dilatation and curettage for spontaneous abortion. The primary treatment modality for endometrial cancer is surgery. Aside from staging, surgery will help identify the correct histologic diagnosis. If diagnosis is still uncertain, additional modalities such as immunohistochemical staining may be necessary. Confirming the diagnosis and stage will aid in identifying the need for adjuvant treatment such as chemotherapy.

Key words: vaginal bleeding, retained products of conception, endometrial adenocarcinoma, carcinosarcoma

Abnormal uterine bleeding after a spontaneous abortion requires a thorough evaluation for retained products of conception, gestational trophoblastic disease, uterine arteriovenous malformation, placenta accrete syndrome, and rarely endometrial cancer.[1] Endometrial cancer is most commonly diagnosed in postmenopausal women. Although less common, approximately less than 5% of women younger than 40 years old can also be diagnosed with endometrial malignancy.[2] The pathophysiology involves an increased exposure of the endometrium to estrogen.

*From the Department Obstetrics Gynecology

According to literature, there has been an increasing number of cases of endometrial cancer among women 30 years old or younger.[3,4] In the young, one of the important risk factors for endometrial cancer is obesity.[5] However, there are limited studies on endometrial cancer among young women.[3] Hence, presented here is a case of a 29-year-old, Gravida 1 Para 0 (0010), with vaginal bleeding and passage of meaty material after dilatation and curettage. Further evaluation led to the diagnosis of a poorly differentiated endometrial neoplasm. However, before the eventual confirmation of endometrial cancer by histopathology, there was an evident dilemma in obtaining the correct diagnosis and the underlying cause of abnormal uterine bleeding. Confirming the diagnosis, particularly the histologic type, will

help the obstetrician gynecologist to institute the appropriate treatment for such cases. Thereby, improving the quality of life and survival of young women who present with this problem.

The objective of the report was to discuss the case of a 29-year-old, Gravida 1 Para 0 (0010) with histologic consideration of poorly differentiated endometrial adenocarcinoma endometrioid pattern and carcinosarcoma (malignant mixed mullerian tumor), presenting as persistent vaginal bleeding after dilatation and curettage for incomplete abortion.

THE CASE

This is a case of a 29-year-old, Gravida 1 Para 0 (0010), who presented with moderate vaginal bleeding and passage of meaty material 8 weeks prior to admission in FEU-NRMF. No associated hypogastric pain was noted. The patient consulted a private OB-GYN who requested for a pregnancy test which revealed a positive result. Transvaginal ultrasound was also done which revealed retained products of conception, with an endometrial thickness of 2.90cm. Hence, she was advised to undergo completion curettage. However, the patient did not comply.

Seven weeks prior to admission, still with minimal vaginal bleeding, she then consented to have a dilatation and curettage done. The histopathologic finding showed necrotic decidua and placental tissues. The vaginal bleeding was also noted to resolve. However, four weeks prior to admission, there was recurrence of vaginal bleeding consuming 3 moderately soaked diapers per day, still with meaty materials. No associated symptoms noted such as hypogastric pain, dizziness and easy fatigability. The patient consulted another OB-GYN wherein transvaginal ultrasound was done and revealed slightly enlarged anteverted uterus measuring 7.41cm x 8cm x 5.74cm) with intra-endometrial contents exhibiting mixed echoes and intra-endometrial vascularity dilating the endometrial cavity by 3.50cm. The sonologist reported that gestational trophoblastic disease cannot be totally ruled out. The ovaries were unremarkable. There were no medications given.

Three weeks prior to admission, due to persistence of vaginal bleeding consuming 3 moderately soaked diapers per day, now associated with easy fatigability, she consulted the third OB-GYN. A repeat transvaginal ultrasound was requested which revealed anteverted enlarged uterus, with a 5.28cm x 5.89cm x 3.20cm heterogenous mass occupying the endometrial cavity. Retained products of conception was highly considered but cannot totally rule out gestational trophoblastic disease. The right ovary was unremarkable while the left was considered to have a cystic follicle. Serum β-hCG was done and revealed a less than 5 mIU/mL level. Complete blood count showed moderate anemia with a hemoglobin of 88g/L. The patient was started with Ferrous Sulfate 1 tablet three times a day and Cefuroxime 500mg/tab 1 tablet twice a day for 7 days. The patient was also given methylergonovine (Methergine) 125 mcg/tablet 1 tablet three times a day for 5 days. She then passed out meaty material on the 5th day of methylergonovine intake.

Three days prior to admission, due to the persistence of vaginal bleeding and easy fatigability, the third OB-GYN requested for a repeat transvaginal ultrasound. This revealed an enlarged anteverted uterus with heterogeneously thickened endometrium (3.5cm), to consider endometrial pathology. Other findings include normal sonogram of both ovaries, closed cervix with mixed echoes, and nabothian cysts. Hence, the patient was referred to and admitted in FEU-NRMF for further evaluation and management.

On physical examination, she has stable vital signs, with pale palpebral conjunctiva, pinkish palms and nail beds. Her abdomen was flabby soft, with no palpable masses. On speculum examination, a clean looking cervix with scanty vaginal bleeding per os was noted. Internal examination revealed a normal looking external genitalia, nulliparous introitus, vagina admits 2 fingers with ease, cervix firm and closed, no cervical motion tenderness, uterus enlarged to 2 to 3 months size, no uterine tenderness, no adnexal mass or tenderness. The assessment on admission was Gravida 1 Para 0 (0010), Late Postpartum Hemorrhage probably secondary to Retained Products of Conception, Rule out Gestational Trophoblastic Disease and Arteriovenous Malformation, Moderate Anemia, Secondary (Symptomatic), Status Post Dilatation and Curettage (4/12/2022) - Necrotic Decidua and Placental Tissue, Obese I. The plan of the general service was to correct the anemia with transfusion of 2 units of Packed Red Blood Cells (PRBC) properly typed and crossmatched. The service also requested for transvaginal ultrasound with doppler studies and serum β-hCG. Once the patient is stable, suction versus endometrial curettage was contemplated.

On admission, complete blood count revealed moderate anemia with hemoglobin of 81g/L and a

serum β-hCG of less than 2mIU/mL. The transvaginal ultrasound done revealed an enlarged anteverted uterus measuring 8.71cm x 9.22cm x 6.43cm with an endometrial mass that exhibited non-benign sonomorphologic features and probable myometrial invasion. The consideration was gestational trophoblastic neoplasia since the endometrial cavity is occupied by a heterogenous structure measuring 3.29 in height with a strong color flow (color score: 4) most prominent at the anterior mid to lower segment myometrial wall. The ultrasound scan also revealed the myometrial walls to be thinned out by the endometrial mass with the anterior myometrial wall measuring 0.96cm, the posterior 1.67cm and at the fundal portion measuring 0.55cm. The ovaries were unremarkable. (Figure 1)

Due to the transvaginal ultrasound findings, gestational trophoblastic neoplasia (GTN) versus placenta accrete syndrome was then considered. Hence, the patient was then referred to the Gestational Trophoblastic Disease specialist who requested for urinalysis, thyroid function test, chest x-ray, blood chemistry such as sodium, potassium, chloride, SGPT, SGOT, BUN and creatinine. All of these laboratory work-ups revealed normal results. Blood transfusion with 2 units PRBC properly typed and crossmatched was also started to manage the moderate anemia.

On the second hospital day, the patient had stable vital signs, with pink palpebral conjunctiva, palms and nail beds, now with scanty to minimal vaginal bleeding. Complete blood count 6 hours post blood transfusion of 2 units PRBC revealed a hemoglobin of 98 g/L, hence the patient was started with Carbonyl Iron 1 tablet twice a day. The patient was then cleared for surgery and underwent Diagnostic Hysteroscopy followed by Suction Curettage under Subarachnoid Block. Intraoperatively, the tubal ostia were obscured by multiple endometrial masses, with minimal vascularity occupying the entire endometrial cavity. Suction curettage was then done followed by endometrial curettage after all tissues were aspirated. One small cup of tan, non-friable tissues were obtained. Histopathologic findings revealed a poorly differentiated neoplasm with considerations of poorly differentiated endometrial adenocarcinoma, endometrioid pattern and carcinosarcoma (malignant mixed mullerian tumor). To further obtain a specific diagnosis, the plan of the service was to request

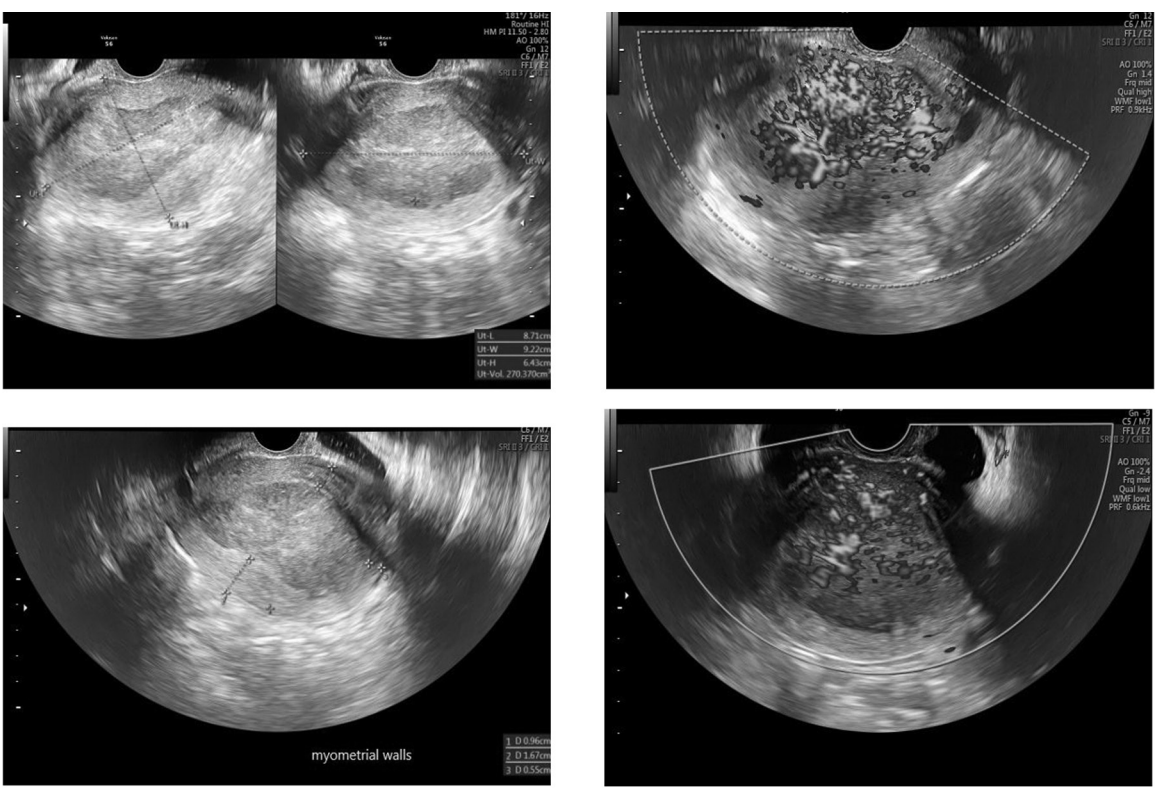

Figure 1. Enlarged anteverted uterus measuring 8.71cm x 9.22cm x 6.43cm. Endometrial mass with non-benign sonomorphologic features and a probable myometrial invasion.

immunohistochemical staining with CD10, vimentin, SMA, cytokeratin and Ki67 as suggested by the pathology department.

In order to cater to the limited resources of the patient, the service referred her to a tertiary government hospital. However, to the present time, the proposed management has not been done.

DISCUSSION

The investigator was presented with a case of 29-year-old, Gravida 1 Para 0 (0010), with persistent vaginal bleeding and passage of meaty material after a postabortal dilatation and curettage. Vaginal bleeding if left untreated can result in complications such as anemia and if severe enough can compromise the life of the woman. Hence, prompt diagnosis is warranted to be able to institute a timely and appropriate intervention.

What are the chances of vaginal bleeding after a dilatation and curettage? According to Braaten, et al. excessive vaginal bleeding following a dilatation and curettage is uncommon.20 Among these women, what are the possible differentials? Based on the salient features, differential diagnosis of vaginal bleeding to be considered following a curettage are Retained products of conception (RPOC) which include the placenta accrete syndrome, uterine arteriovenous malformation and gestational trophoblastic disease (GTD).[7]

The RPOC is a known obstetrical complication, with an incidence of 3% of deliveries in gestational ages of less than 26 weeks.[8] The primary imaging modality that can be requested to further evaluate postpartum hemorrhage is transvaginal ultrasound. One ultrasound finding for retained products of conception is the presence of thickened endometrial echo complex (EEC) of at least 10mm. This finding has a diagnostic sensitivity of 80%. Another finding is the presence of endometrial or intrauterine mass which has a 79% diagnostic sensitivity. Also included in the evaluation of the endometrium in determining the presence of RPOC is the use of Color Doppler. Any vascularity in a thickened EEC or mass increases the likelihood of RPOC.[9] In our patient, she presented with all of the findings associated with retained products of conception. Hence, this is the reason why this differential was ruled in. However, retained products of conception do not exhibit an endometrial mass with presence of myometrial invasion. Although, if this is a retained placenta associated with a placenta accrete syndrome, the latter finding may be possible.

Thereby, another consideration is Placenta Accrete Syndrome (PAS), wherein an abnormally adherent placenta into the uterine wall which complicates about 0.9% of pregnancies.[10] This syndrome is diagnosed in 4.3 % of women with persistent vaginal bleeding after a dilatation and curettage.[11] Imaging modality such as ultrasound is also considered as the initial diagnostic test for this condition with a 77% sensitivity and 96% specificity. Ultrasound findings suggestive of PAS include the loss of the retroplacental hypoechoic clear zone, loss of the bladder wall-uterine interface, presence of placental lacunae and the presence of hypervascularity of the interface between the uterine serosa and the bladder wall seen on Color Doppler imaging. Another imaging modality in the evaluation of placenta accrete syndrome is magnetic resonance imaging (MRI) with a sensitivity of 88% and a specificity of 100%, wherein absence of the myometrium at the site of implantation, and nodular interface between the placenta and the uterus and dark intra-placental bands are seen on T2-weighted MRI.[10] These 2 diagnostic modalities are comparable and either can be used in the diagnosis of PAS. In this patient, ultrasound with color flow was done which revealed strong color flow (color score: 4) most prominent at the anterior mid to lower segment myometrial wall. This ultrasound finding is consistent with PAS. However, this is not a primary consideration because of the low serum B-hCG level at presentation and findings of the last ultrasound which showed non-benign sonomorphologic features.

With the presence of an endometrial mass with non-benign sonomorphologic features and probable myometrial invasion, a consideration of gestational trophoblastic neoplasia (GTN) can be made. As a rare complication of pregnancy, Gestational Trophoblastic Disease (GTD) encompasses a spectrum of diseases originating from the placenta ranging from premalignant partial and complete hydatidiform mole to malignant diseases of an invasive mole, choriocarcinoma, and rare placental-site trophoblastic tumor (PSTT) and epithelioid trophoblastic tumor (ETT).[9,12] These four malignant diseases presents with persistently elevated serum B-hCG levels but can be differentiated histologically.[9,12] Based on the Philippine Obstetrical and Gynecologic Society (POGS) Clinical Practice Guidelines (CPG), the recommended work-up for gestational trophoblastic neoplasia include serum B-hCG, complete blood

count, urinalysis, thyroid function test, chest x-ray, blood chemistry such as sodium, potassium, chloride, SGPT, SGOT, BUN and creatinine.[13] These were all done in the patient in this case and were normal including the serum B- hCG. However, in cases of GTN, the serum B-hCG is expected to be elevated but in the current case, it was less than 2 mIU/mL. Given the transvaginal ultrasound result, a consideration of GTN possibly Placental Site Trophoblastic Tumor can be made. But with a relatively low B-hCG result, this probability can be ruled out.

Another consideration in this case is Uterine Arteriovenous Malformation (AVM), which are rare lesions that arise from an abnormal connection between an artery and a vein. This can mimic the ultrasound features of retained placental fragments.[9,14] These vascular anomalies are more common in reproductive aged women but rare among nulligravid. Uterine AVM usually presents as uterine bleeding after a curettage for spontaneous abortion. The bleeding that curettage can induce for this condition can be life threatening.[15] The diagnosis of uterine AVM is best achieved by a transvaginal ultrasound with color and pulsed doppler, which is a non-invasive method. On color doppler, these lesions can be localized as an area of increased vascularity within the myometrium. With the use of pulsed doppler, this will show a low-resistance blood flow with high peak velocities and evidence of turbulence in the AVM area.[14] In complicated cases, MRI is also reported to be a useful imaging modality in the evaluation of the vascularity. MRI findings include a cluster of distinct and tortuous coiled vascular channels, or a focal uterine mass with serpiginous flow voids, disrupted junctional zones and prominent parametrial vessels.[15] But since MRI is expensive, ultrasound with color doppler findings was done which showed a heterogeneous structure measuring 3.29 in height with strong color flow (color score: 4) most prominent at the anterior mid to lower segment myometrial wall. Hence, with these findings, uterine AVM cannot be totally ruled out.

With the dilemma in diagnosing the specific cause of vaginal bleeding, the service team decided to proceed with Diagnostic Hysteroscopy followed by Suction Curettage under Subarachnoid Block (Figure 2). Operative hysteroscopy has the advantage of direct visualization of the uterine cavity. The intraoperative findings in the current case showed that the tubal ostia were obscured by multiple endometrial masses, with minimal vascularity occupying the entire endometrial cavity. After which, suction curettage was done wherein tissues were aspirated. To complete the procedure, a gentle sharp curettage was done wherein 1 small cup of tan, non-friable tissues. Hence, submitting the tissues for histopathologic evaluation is warranted to confirm the diagnosis. Based on the histopathologic report, poorly differentiated neoplasms were considered and this include endometrial adenocarcinoma endometrioid pattern and carcinosarcoma, a malignant mixed mullerian tumor. To obtain the exact histologic tissue diagnosis, immunohistochemical staining with CD10, Vimentin, SMA, Cytokeratin and Ki67 was suggested.

Immunohistochemical staining with CD10 and smooth muscle actin (SMA) are compatible with endometrial stromal tumors (EST). Although CD10 is not always expressed in endometrial stromal tumors, it is positively expressed in 20-30% of smooth muscle tumors. While SMA is a common smooth muscle marker for EST, however with a low specificity.[16] Immunohistochemical staining with vimentin is compatible with endometrioid endometrial carcinoma with strong cytoplasmic staining of 80%–90% tumor cells.[17] If we are considering an endometrioid type of endometrial carcinoma, the tumor will be positive to cytokeratin and is also known as a valuable biomarker for poorly differentiated carcinomas.[18] Lastly, Ki67, which serves as a marker for cellular proliferation and a prognostic biomarker in endometrial cancer.[19] However, the suggested immunohistochemical staining with CD10, Vimentin, SMA, Cytokeratin and Ki67 are costly at around PHP 11,000 to 17,000 For this reason, the patient, up to the present time, is still searching for resources in order to fund immunohistochemical staining which can aid us in identifying the specific endometrial neoplasm.

Endometrial carcinoma is one of the most common gynecologic malignancy and most frequently diagnosed in postmenopausal women. However, it may also occur in approximately 5% of women younger than 40 years old.[2,4] In other literatures, it has been reported to have an incidence 2 to 14% of young women, and may be due to sporadic or hereditary causes that is mostly diagnosed after a first trimester pregnancy loss.[3] According to Macaurog et al, there has been increasing cases of endometrial adenocarcinoma seen in young women. However, studies regarding the occurrence of endometrial carcinoma in women aged 30 years old or younger is limited.[3] In this case, it was diagnosed 8 weeks after a spontaneous abortion. The co-existence of endometrial carcinoma and pregnancy where in the

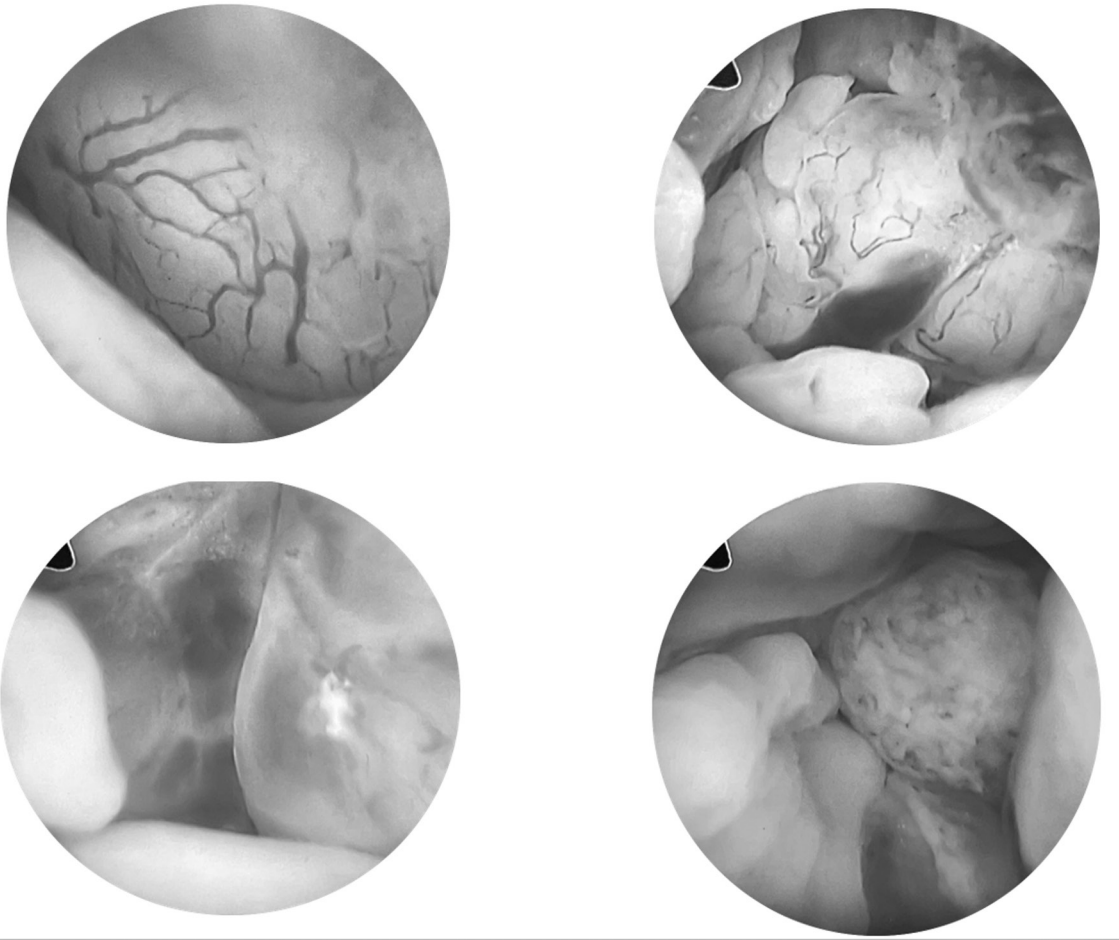

Figure 2. Intraoperatively, the tubal ostia were obscured by multiple endometrial masses, with minimal vascularity occupying the entire endometrial cavity. Proceeded with suction curettage, after all tissues were aspirated and with a contracted uterus, thorough and gentle sharp curettage was done until gritty sensation was felt obtaining 1 small cup of tan, non-friable tissues.

diagnosis is done during postpartum may be consistent with an onset of the disease during pregnancy.[21] According to the case report of Shiomi, et al., there were 16 out of 25 cases diagnosed with Endometrial Carcinoma after a spontaneous abortion following curettage in the first trimester.[4]

Another rare type of endometrial cancer is uterine carcinosarcoma or previously called the malignant mixed mullerian tumor (MMT) which approximately accounts for less than 5% of all uterine malignancies. Similar to endometrial adenocarcinoma it is more common in older postmenopausal women, with an incidence of 1 to 4 per 100,000 women.[22] It is a typically aggressive biphasic tumor composed of both high-grade carcinomatous and sarcomatous components.[23] Usually it presents as vaginal bleeding, uterine enlargement, or a pelvic mass. Approximately, about 45% of cases are already at stage III or IV upon diagnosis.22,[23]

The risk factors for endometrial carcinoma and uterine carcinosarcoma are similar, except for previous pelvic irradiation which has been identified as an occasional predisposing factor for uterine carcinosarcoma.[22,24] Risk factors include prolonged exposure to estrogen and obesity have been established.[5] Those present in our patient were obesity, nulliparity and history of Polycystic Ovarian Syndrome wherein anovulation leads to prolonged estrogen exposure.

Surgery is the primary treatment for both endometrial adenocarcinoma and uterine carcinosarcoma for staging and to further come up with a specific diagnosis to initiate the appropriate management.[22,24] A comprehensive surgical staging with peritoneal fluid cytology, extra fascial hysterectomy followed by bilateral salpingooophroectomy with pelvic and paraaortic lymph node dissection is recommended.[22,24] However, the removal of the ovaries and a lymph

node dissection in women diagnosed with uterine carcinosarcoma, still remains controversial since it is frequently associated with an intra-abdominal disease and a small percentage of cases presents with metastases to the other organs.[25] Chemotherapeutic regimen differs with endometrial carcinoma and uterine carcinosarcoma. Carboplatin and Paclitaxel for treatment of advanced endometrial cancer which appears to be an active regimen with minimal toxicity. With an overall survival for patients treated with both chemotherapy and radiation were 62% and 79% respectively.[26] On the other hand, Docetaxel/ gemcitabine, doxorubicin and ifosfamide are all options in the treatment for the advanced or recurrent disease with response rates ranging from 17% to 36%.[25]

It is said that carcinosarcoma is more aggressive than endometrial carcinoma with an overall 5-year specific survival rate of 50% for those with stage 1 and 2, 25% for stage 3 and only 10% for stage 4.[25] As compared to high-grade endometrial cancer in which a 5-year survival rate in stages I to 4 disease of approximately more than 80%, 70%, 60% and 15% respectively.[24,25]

The patient was advised and counselled regarding the management of the case. However, due to financial constraints, the appropriate management has not yet been instituted. To date, the authors still does not have the exact diagnosis, since the necessary test such as the immunohistochemical staining has not been also done. As a physician, her primary goal is to provide quality care and resources needed. Hoping that if the resources are already available, the intervention would still be timely.

With reports regarding co-existence of endometrial carcinoma and pregnancy, though quite limited[3], a high index of suspicion should be kept in place. Obstetricians should be more meticulous in evaluating patients with vaginal bleeding after a spontaneous abortion as any complications may arise at any point. Even if certain conditions are rare, such as endometrial carcinoma in pregnancy, they should still be keen in identifying such cases. With the correct diagnosis, the provision of optimal treatment can be achieved. Early detection translates to early institution of treatment which subsequently leads to prompt improvement of the condition and better survival rates.

SUMMARY

This is a case report of a rare coexistence of endometrial cancer and pregnancy presented as persistent vaginal bleeding after a spontaneous abortion in a 29-year-old woman. Imaging modalities together with laboratory findings and physical examination may aid in distinguishing one differential from another. A consideration of a number of conditions seen on ultrasound were made such as retained products of conception, placenta accrete syndrome, gestational trophoblastic disease and uterine arteriovenous malformation. Although other imaging modalities such as CT scan and MRI should also be done to differentiate these conditions, however, these were not done due to financial constraints. With the dilemma in diagnosing the specific cause of vaginal bleeding, a diagnostic hysteroscopy followed by suction curettage was done. Based on the histopathologic report, poorly differentiated neoplasms were considered and these include endometrial adenocarcinoma endometrioid pattern and carcinosarcoma, a malignant mixed mullerian tumor. Immunohistochemical staining with CD10, Vimentin, SMA, Cytokeratin and Ki67 was suggested to obtain the exact histologic tissue diagnosis. Endometrial cancer is rarely associated with pregnancy and less than 5% of cases occurs in women aged less than 40 years old.[6] The primary treatment modality for endometrial cancer is surgery for staging.[17] Aside from staging, surgery will help identify the correct histologic diagnosis. If diagnosis is still uncertain, additional modalities such as immunohistochemical staining may be necessary. Confirming the diagnosis and stage will aid in identifying the need for adjuvant treatment such as chemotherapy and radiotherapy. Due to lack of resources, the final diagnosis has not yet been established.

REFERENCES

1. Brenner PF. Differential diagnosis of abnormal uterine bleeding. Am J Obstet Gynecol 1996; 175(3): 766–9. https://doi.org/10.1016/s0002-9378(96)80082-2
2. Lekhi A, Manchanda RJN, Chithra S, Kausar H. Endometrial carcinoma in young women: management options and its review 2016; 944–7. doi:10.18203/2320-1770.ijrcog20160674
3. Macaurog BA & Toral JA. Clinical characteristics and prognosis of young Filipino women ages 30 and below with endometrial cancer: A ten-year retrospective cohort study. Phil J Gynecol Oncol 2019; 16(1): 19–24. http://sgop.org.ph/wp-content/uploads/2020/11/PJGO-Volume-16-No.-1-2019.pdf
4. Shiomi M, Matsuzaki S, Kobayashi E, et al. Endometrial carcinoma in a gravid uterus: a case report and literature review. BMC Preg Childbirth 2019; 19: 425. https://doi.org/10.1186/s12884-019-2489-y

5. Guo F, Levine L & Berenson A. Trends in the incidence of endometrial cancer among young women in the United States, 2001 to 2017. J Clin Oncol 2021; 39(15_suppl), 5578. https://doi.org/10.1200/jco.2021.39.15_suppl.5578
6. Braaten K. Patient education: Dilatation and curettage(D&C) (Beyond the Basics). Uptodate. Retrieved August 24, 2022, from https://www.uptodate.com/contents/dilation-and-curettage-d-c-beyond-the-basics/print
7. Carusi D. Retained products of conception in the first half of pregnancy. Uptodate. Retrieved August 24, 2022, from https://www.uptodate.com/contents/retained-products-of-conception-in-the-first-half-of-pregnancy#H25
8. Perlman NC & Carusi DA. Retained placenta after vaginal delivery: risk factors and management. Int J Women's Health 2019; 11: 527–34. https://doi.org/10.2147/ijwh.s218933
9. Kohi MP, Rizzuto GA, Fidelman N, Lucero J & Thiet MP. Retained Placenta Accreta Mimicking Choriocarcinoma. Case Rep Pathol 2015; 1–4. https://doi.org/10.1155/2015/167986
10. Dwyer B, Rao A, Tran L, Belogolovkin V, Carroll I, Barth R & Chitkara U. OC46: Prenatal diagnosis of placenta accreta by ultrasound and magnetic resonance imaging. Ultrasound Obstet Gynecol 2006; 28(4): 372. https://doi.org/10.1002/uog.2906
11. Wang YL, Weng SS & Huang WC. First-trimester abortion complicated with placenta accreta: A systematic review. Taiwanese J Obstet Gynecol 2019; 58(1): 10–4. https://doi.org/10.1016/j.tjog.2018.11.032
12. Soper J. Gestational trophoblastic disease: Current evaluation and management. Obstet Anesth Digest 2021 41(4): 168–9. https://doi.org/10.1097/01.aoa.0000796088.25096.4b
13. Murali R, Davidson B, Fadare O, et al. High-grade endometrial carcinomas. Int J Gynecol Pathol 2019; 38: S40–S63. https://doi.org/10.1097/pgp.0000000000000491
14. Kelly SM, Belli AM & Campbell S. Arteriovenous malformation of the uterus associated with secondary postpartum hemorrhage. Ultrasound Obstet Gynecol 2003; 21(6): 602–5. https://doi.org/10.1002/uog.148
15. Kido A, Togashi K, Koyama T, Ito H, Tatsumi K, Fujii S, Konishi J. Retained products of conception masquerading as acquired arteriovenous malformation. J Comp Assist Tomogr 2003; 27(1): 88–92. doi:10.1097/00004728-200301000-00016
16. Zhao W, Cui M, Zhang R, et al. IFITM1, CD10, SMA, and h-caldesmon as a helpful combination in differential diagnosis between endometrial stromal tumor and cellular leiomyoma. BMC Cancer 2021; 21: 1047. https://doi.org/10.1186/s12885-021-08781-w
17. Reid-Nicholson M, Iyengar P, Hummer AJ, Linkov I, Asher M, Soslow RA. Immunophenotypic diversity of endometrial adenocarcinomas: implications for differential diagnosis. Mod Pathol 2006; 327. doi:10.1038/modpathol.3800620
18. Vasilevska D, Rudaitis V, Adamiak-Godlewska A, Semczuk-Sikora A, Lewkowicz D, Vasilevska D, Semczuk A. Cytokeratin expression pattern in human endometrial carcinomas and lymph nodes micrometastasis: a mini-review. J Cancer 2022 Mar 14; 13(6): 1713-24. doi: 10.7150/jca.70550.
19. Aggarwal N, Bhargava R, Elishaev E. Uterine adenosarcomas: diagnostic use of the proliferation marker Ki-67 as an adjunct to morphologic diagnosis. Int J Gynecol Pathol 2012 Sep;31(5): 447-52. doi: 10.1097/PGP.0b013e318249285b.
20. Laing-Aiken Z, Ooi S, Mylvaganam G, Xie H, Ludlow J, & Pather S. Grade 3 endometrioid adenocarinoma of the lower uterine segment diagnosed 6 weeks after a term delivery: A case report and literature review. Gynecol Oncol Rep 2021; 38, 100884. https://doi.org/10.1016/j.gore.2021.100884
21. Rizzuto I, Nicholson R, Dickinson K, Juang H, MacNab W & Rufford B. A case of incidental endometrial adenocarcinoma diagnosed in early pregnancy and managed conservatively. Gynecol Oncol Rep 2019; 28: 101–3. https://doi.org/10.1016/j.gore.2019.03.015
22. Soror NN, Woredekal D, Hemrock L, Gibson G & Bennett R. Uterine carcinosarcoma in a young female: Case report and literature review. Cureus 2021. https://doi.org/10.7759/cureus.12642
23. Cagayan SF, Cruz MB & Quevedo MC. Gestational trophoblastic neoplasia. Clinical practice guidelines for the diagnosis and management of gestational trophoblastic diseases 2011; 20–30.
24. Gershenson D, Lentz G, Valea F, Lobo R. Comprehensive Gynecology (8th ed.). Elsevier. 2021.
25. Prat J, Mbatani N. Uterine sarcomas. Int J Gynecol Obstet 2015; 131(Suppl.2):S105–10.
26. Akram T, Maseelall P & Fanning J. Carboplatin and paclitaxel for the treatment of advanced or recurrent endometrial cancer. Am J Obstet Gynecol 2005; 192(5): 1365–7. https://doi.org/10.1016/j.ajog.2004.12.032