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Cesarean Scar Ectopic Pregnancy: Experience From Benghazi Medical Center, 2022

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A B S T R A C T

Abstract:
Background: Cesarean scar pregnancy (CSP) is a rare consequence of a previous cesarean delivery and a new type of ectopic pregnancy, but it is life-threatening if unrecognized and inadequately managed. Despite the rising incidence of CSP, there are no consensus or evidence-based guidelines for management. **Aims:** To review risk factors, clinical features, diagnostic methods, and management of women with CSP at Benghazi Medical Center. **Materials and methods**: A descriptive-case series study of CSP cases between the Ist of March 2018 and Ist of April 2022.. Data collected retrospectively. The data included demographics, presenting symptoms and signs, ultrasound findings, treatment used, and any complications. **Results:** The total number of ectopic pregnancies in period between 1st March 2018 and 1st April 2022 was 262, ten women (3.82%) were diagnosed as scar ectopic, The women's ages ranged from 28 to 47 years, about 60% had three or four previous cesarean scars, abdominal pain with vaginal bleeding was in 30% of the cases, while 60% of patients were asymptomatic and all patients were stable during the diagnosis, except for one case that had signs of shock. ultrasound finding was 80% presence of gestational sac implanted low near the previous scar; initial diagnosis was delayed by 50%. The management was laparotomy and gestational sac excision in four cases that did not require further treatment, dilatation and uterine evacuation were done in two cases that required use of uterine balloon to control bleeding and further use of methotrexate In one case (10%), systemic methotrexate alone was effective. Severe bleeding was seen among 60% of women, and 20% underwent hysterectomy. The complications were significantly ($P< 0.05$) more common among women with high parity and also in cases where there was no intervention during the diagnosis. **Conclusion: A** previous uterine scar is the main risk factor for CSP; there is no specific clinical feature for CSP; ultrasound is used for the diagnosis; surgical management appears to be a better option, serious complications were seen mainly when no intervention was done during the diagnosis.

1.Inroduction

Ectopic pregnancy (EP) is a pregnancy that implants in a site other than the uterine cavity, most ectopic pregnancies located in the fallopian tube (Morenteet al., 2021). Non-tubal ectopic pregnancies account for less than 10% of all extrauterine pregnancies (Alkatout I et al., 2013). It is one of the most serious complications in early pregnancy(San Lazaro Campilloetal., 2018) 3 In the last decade due to the increased rate of delivery by cesarean section, a new type of ectopic pregnancy was seen after cesarean delivery in which the implantation of the gestational sac in the cesarean scar, known as Cesarean Scar Pregnancy (CSP)(Seowet al., 2004;Timor-Tritsch IE&Monteagudo, 2012).It was described for the first time in 1978 (Larsen J.V & Solomon M.H 1978). Since then, CSP has been rapidly rising in incidence due to both increased recognition and increased rates of cesarean deliveries being performed worldwide(Timor-Tritsch, Monteagudo, 2012; RCOG, 2016; Rosta, 2006).It was reported that CSP around 6.1% of women with an ectopic pregnancy, had at least one previous Cesarean section. The number of CSP correlates with the number of Cesarean deliveries performed (Seow K.M et.al, 2004; Rosta M, 2006; Jurkovic D. et al, 2003;Birch Petersen, K. et al. 2016). If the scar is deficient and there was a visible gap in the myometrium, the pregnancy is implanted within it, surrounded completely by the fibrous tissue of the previous scar, and separated from the uterine cavity bulging towards the bladder. (Jurkovicet al., 2003;Hoffman& Lin, 2020). The pathophysiology explains a migration of the fertilized ovum into the myometrium through microscopic lacunas to the scar defect. It is reported that other uterine surgical procedures, such as curettage, vacuum aspiration, and manual removal of the placenta, can be causal factors(Rosta2006; Birch Petersenet al., 2016).There are two types of CSP: Type I (endogenic) with progression towards the cervico-isthmic space that bulges into the uterine cavity, and Type II (exogenic) with deep invasion inside the scar defect with progression towards the bladder and abdominal cavity, which, if left untreated, may lead to severe bleeding, rupture of the uterus, and hysterectomy(Timor-Tritsch&Monteagudo, 2012; Gonzalez&Tulandi, 2017). The endogenic CSP could result in a viable pregnancy, If this pregnancy proceeds, it can develop into a morbidly adherent placenta such as an accreta, increta, or percreta.(Glenn et al., 2018).
CSP poses a greater risk for maternal hemorrhage and ultimately maternal mortality if unrecognized and inadequately managed, uterine rupture and loss of future fertility are also associated with this condition(Morente *et al*., 2021).

There are no protocols to identify women who are at risk of a CSP, a number of risk factors have been suggested, such as parity, the number of previous caesarean sections, breech presentation, and smoking were found to be a risk factors.As for a large Cesarean section scar defect, the technique of closing the cesarean wound, or a short period between a cesarean delivery and a new pregnancy were all associated with CSP.(Gull , 2021)also the vitro fertilization (IVF) techniques(Zhou, Li &Fu , 2020), maternal age older than 35 years, multiparty, and history of CS performed in a rural hospital were considered as risk factors.(Seow*et al*., 2000;Jayaram, Okunoye&Konje, 2017).CSP has nonspecific clinical features that vary from asymptomatic to sharp abdominal pain with vaginal bleeding even to a hypovolemic shock (Darwish,&Habash, 2020)
and (Arin *et al*., 2014).A retrospective case–control study done by(Zhou, Li &Fu , 2020), reported that vaginal bleeding with or without abdominal pain were identified as a clinical characteristics of CSP.As for the diagnosis, it was difficult because it resembles a cervical ectopic pregnancy or miscarriage in progress.Transvaginal ultrasound was the best method for accurate diagnosis, the findings are the presence of gestational sac at the site of the previous uterine incision with an empty uterine cavity and cervix, as well as a thin myometrium adjacent to the bladder and vascularity at the implantation site (D'Antonio,*et al*., 2016).However, many cases are misdiagnosed as threatened, missed, or incomplete miscarriage or intrauterine pregnancy. Such a misdiagnosis may lead to sharp curettage for a presumed failed pregnancy, which can result in profuse bleeding and emergency surgical intervention, on occasions it may end up with hysterectomy (Vial, Petignat, &Hohlfeld, 2000).A variety of treatment options have been tried for CSP, but the optimal, safe and effective approach is still not determined. It is a common practice to offer a termination of the pregnancy at the time of the diagnosis because of the high rate of morbidity associated with CSP. (Boza and Murat, 2016).Medical and operative methods for termination are approved, while expectant management is considered unsafe(Birch Petersen *et al*., 2016; Gerday*et al*., 2020) Medical options include systemic or local administration of methotrexate (MTX). Numerous reviews report that systemic methotrexate administration was an effective way of treating CSP , by a single dose of 50 mg/m2 administered intramuscularly up to the 8th week of pregnancy and serum HCG levels are lower than 5000 mIU/ml with no fetal heart activity. (Seow*et al*.,2000; Kim *et al*., 2018) However, MTX treatment alone as the first line of treatment showed a low success rate. Some authors criticize systemic MTX administration due to the fact that fibrous tissue is poorly vascularized, so drug penetration is insufficient. They suggest local administration of MTX directly to the gestational sac(Doroszewska*et al*., 2019; Glenn*et al*., 2018)a local administration of 5 ml 10% potassium chloride (KCl) and 50 mg of MTX into the gestational sac and 100 mg of MTX systemically is an effective and safe method to maintain the patient's fertility(Doroszewska*et al*., 2019; Timor-Tritsch*et al*.,2016).Several operative techniques were described for CSP, including dilation suction curettage under ultrasound guidance; direct excision of scar ectopic via laparotomy, laparoscopic, or hysteroscopic approach. Surgical treatment is successful in 96% of cases; it removes the gestation and offers an opportunity to repair the uterine defect and a chance for future fertility (Xu *et al*., 2022) Surgery may be undertaken in patients who are hemodynamically unstable or when medical treatment have failed. In cases that are complicated by heavy intraoperative bleeding, a Foley catheter was inserted at the level of the implantation site and inflated with 30–90 mL of saline in an attempt to achieve hemostasis by compression. The catheter was left in situ for 12–24 h and then gradually deflated and removed (Marchand*et al*., 2022). Others proceed in a similar way in the case of embryo without FHR, but they administrate MTX systemically as an intensification of treatment(Timor-Tritsch*et al*., 2016; Marchand*et al*., 2022)
Hysteroscopic treatment has an important role in the treatment of CSP, and UAE can be used as an adjuvant treatment prophylactically to reduce the risk of bleeding and also during other therapeutic procedures such as uterine D&C, laparoscopy, hysteroscopy, or local resection, were all associated with a significant decreased duration of hospitalization(Tumenjargal*et al*., 2018; Li *et al*., 2016; Gao *et al*., 2018; Guo*et al*., 2018; Wang *et al*., 2021; Pan& Liu, M2017).It was Liu et al. analysis which method is safer and more effective in CSP treatment based on a statistical analysis of blood loss during the procedure, the time required for the

normalization of HCG levels, and the length of hospitalization was done by (Liu, W *et al*., 2016), they concluded that uterine artery embolization with curettage was proven to be a better method of CSP treatment.Others have reported that treatment with the use of hysteroscopy in patients with myometrium thickness greater than 3 mm is safe, efficient, requires a short hospitalization period, and preserves fertility. Hysteroscopy may also be used as a diagnostic method. (Pan & Liu M, 2017). in other hand, some authors claimed that wedge resection (100%) and hysteroscopy (66.7%) were relatively safe and successful treatment modalities. A combination of medical and surgical treatments has been used to increase the success rate and decrease the risk of complications(Kochman*et al*., 2002)a retrospective case-control study carried out by to compare different methods of treatment for CSP and to explore the optimal intervention. They found that MTX injection with surgery might be the best treatment for CSP patients(Xiao Z *et al*., 2019). Laparoscopic excision of CSP is another effective procedure that can remove gestational tissue and aid in wound repair. It also confirms the diagnosis and can be combined with transvaginal bilateral uterine artery ligation and resection of the scar with gestational tissue from CSP-II (Wang *et al*., 2013). In the absence of standard guidelines, each team offered a medical and/or surgical treatment based on their experience.

Recently, weare facing this life threatening condition with a concern of increased incidence in our hospital. The purpose of this study is to demonstrate the risk factors and clinical presentation of cases of CSP and evaluate the methods of diagnosis and treatment over a period of four years, to clarify the clinical presentation, and study the treatment modality used to manage cases of CSP and its outcome over a 4-year period at Benghazi Medical Center.

2. Patients and methods:

A descriptive-case series study was conducted in the obstetric department at Benghazi Medical Center, include 262 women with ectopic pregnancy , all the cases admitted to BMC in period between the 1st of March 2018 and the 1st of April 2022, ten of these cases had CSP, Data were collected retrospectively from patients' medical records with the aid of a data collection form. The data included demographics, clinical presentations, imaging findings, calculated gestational age, past obstetric history, treatment used, and outcomes of these pregnancies. The data was analyzed by the SPSS program version 23. Descriptive statistics such as frequencies, percentages, mean, and standard deviation were used.

3. Results:

The total number of ectopic pregnancies in the period between 1st March 2018 and 1st April 2022 was 262, and out of them, ten (3.82%) women were diagnosed as scar ectopic (Figure 1).

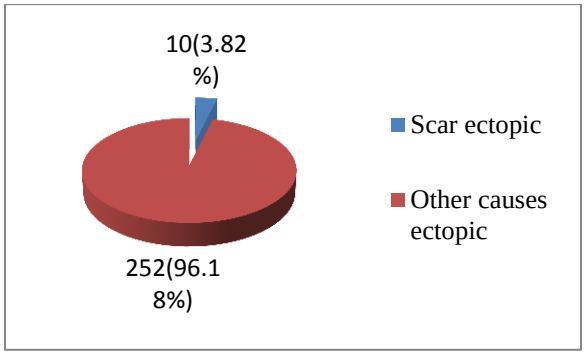

Figure 1: Prevalence of scar ectopic pregnancy among all the ectopic pregnancy cases.

The age range of the patients was from 28 to 47years.The mean age was 37.5 years with SD of 4.8 years. In this study out of the total 10 patients, one (10%) patient had only one previous caesarean and the vast majority (90%) of patients had more than one previous caesarean section (figure 2)

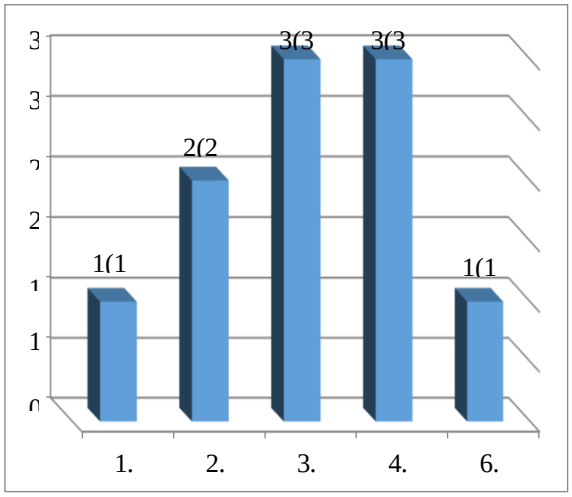

Figure2: Distribution of the women according to the number of previous C/S

Only 3 patients (30%) had exposed to D/C biopsy (figure 3).

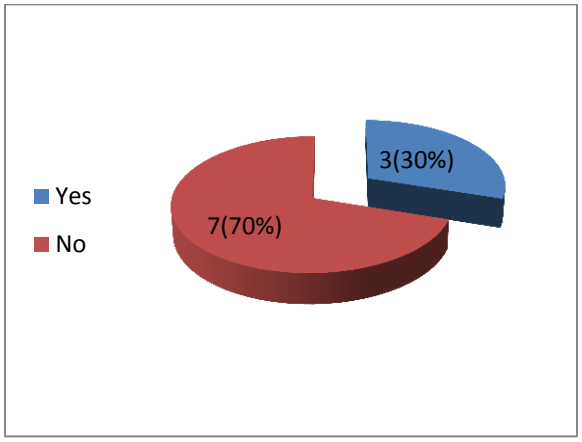

Figure 3: Distribution of the women according to the history of D/C.

Six women (60%) were asymptomatic (Figure 4) and were diagnosed with a scar ectopic pregnancy during routine obstetric ultrasonography.

For the upper jaw, 12 cases have only one canine impacted in the right side (46.2%), 8 cases with left side impaction (30.8%), and 6 cases with bilateral impaction (23.1%), while in the lower arch 2 cases (25%) have right side impaction, 5 cases with left side impaction (62.5%) and one bilateral case impaction (12.5%) as shown in table 1.

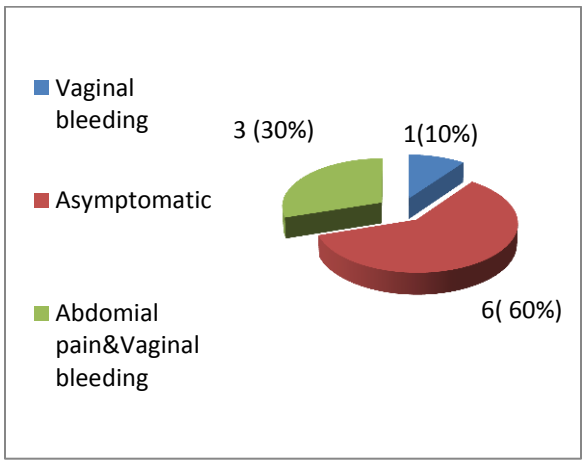

Figure 4: Distribution of the women according to the presenting symptoms

On ultrasonographic examination of the CSP cases, most of them (80%) had gestational sac without fetal pole (Figure 5). The range of gestational age was from 6 to 12 weeks; the mean gestational age was 9.3 weeks, with a SD of 2.11 weeks.

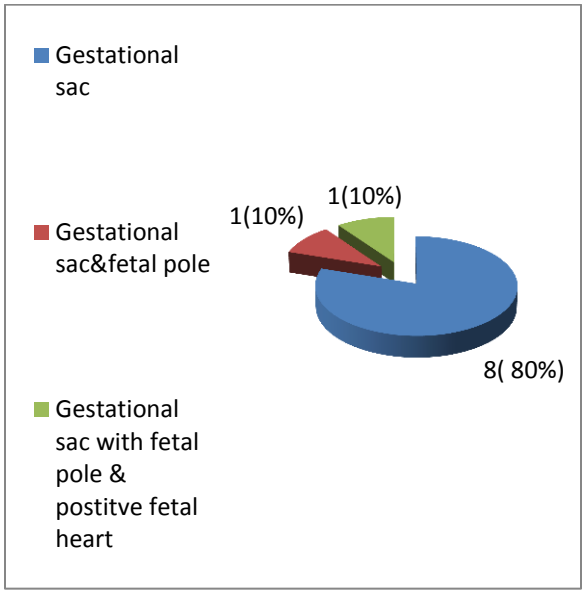

Figure 5: Distribution of the women according to the ultrasound findings

Many different options for management have been done, the most frequent method was laparotomy excision and repair (40%), and hysterectomy was performed in two case (20%) (Figure 6)

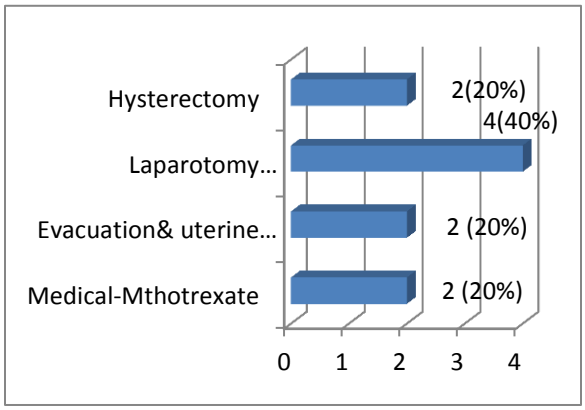

Figure 6:Distribution of the women according to the management modality

4.Discussion

A cesarean scar ectopic pregnancy is seen as a gestational sac embeddedwithin the previous scar defect, surrounded by a scar tissue, and separated from the endometrial cavity; this location is unusual and rare(Gupta*et al*., 2013).The prevalence of cesarean ectopic pregnancy is estimated to be one in 2,000 pregnancies and its diagnosisis increasing with time probably due to the increased rates of cesarean deliveries as well as the use of TVUSS which is confirmed by several studies done worldwide(Seow*et al*., 2004; RCOG , 2016; Rosta, 2006).

The total number of ectopic pregnancies in the period of our study was 262, ten women (3.82%) were diagnosed as scar ectopic, all scar ectopic cases were spontaneous pregnancies except one in which her pregnancy was induced. The women's age ranges from 28 to 47 years, the mean age was 37.5 years with SD of 4.8 years. CSP is found more in older women, it may be related to multiparty,it agrees with a study done by (Zhou XY, Li H & Fu, 2020). As in most of previous studies, all our cases had history of cesarean delivery, 60% had three and four previous cesarean section and one had six previous cesarean section, this is consistent with a study done by (Jurkovic*et al*., 2003) where the CSP was seen with an increasing number of previous cesarean deliveries while in (Qian , Guo&Haung,2014)[42], there was no clear association with a previous cesarean delivery, regarding the other procedures that cause endometrial damage such as myomectomy, in vitro fertilization (IVF), dilation and curettage (D&C), about 20% of cases in this study had history of dilatation and curettage .

Patients with CSP may be asymptomatic or may present with vaginal bleeding, abdominal pain, or hemodynamic instability. In this study it was observed that there were no unique clinical features of CSP, 60% of patients were asymptomatic, 30% had abdominal pain with vaginal bleeding and 10% had only vaginal bleeding. While it was reported by (Michener & Dickinson, 2009), that vaginal bleeding was the most common presenting symptom. In another study done by (Rosta, 2006). It has been found that 36.8% of patients in their case series were asymptomatic at the initial presentation, 38.6% presented with painless vaginal bleeding, and only a minority (24.6%) were presented with abdominal pain.

The diagnosis can be difficult and may occasionally be delayed where the differential diagnosis may include low intra-uterine pregnancy, cervical ectopic pregnancy or even inevitable miscarriage. so early recognition and diagnosis is critically important to minimize maternal complications, and potentially preserve future fertility(Jabeen&Karuppaswamy, 2018). An early detection requires a high index of suspicion, strict diagnostic criteria and properly trained experienced sonographers (Glenn*et al*., 2018). Most of the cases of CSP in this study were diagnosed by transvaginal sonographic examination were performed by Voluson series (G.E Health care), but without referring to the full description of the diagnostic criteria and Doppler study was not applied. MRI is requested in two cases (20%). The range of gestational age at the diagnosis was from 6 to 12 weeks, with a mean gestational age of 9.3 weeks and SD of 2.11 weeks, which is considered late, this is may be due to the misdiagnosis as missed miscarriage, where as in (Michener & Dickinson, 2009) The median gestation age at diagnosis was 6.8 weeks, and in a study conducted by (Yu Zhang et al., 2013) the gestational age at the time of diagnosis was 46 days. While(Jurkovicet al.,2003) reported the diagnosis was ranged between 4 and 23 weeks. In this study the findings of ultrasound were eight patients out of ten who had

gestational sac, only one patient (10%) had gestational sac with fetal pole and one patient (10%)had fetal pole with positive fetal heart. while in (Jan E. Dickinson 2009) about (61%) pregnancies had evidence of cardiac activity .

No consistent management protocol was followed in these cases, the treatment applied according to patient's factors and consultant resources rather than CSP features. The intervention during the diagnosis was mainly surgical by laparotomy and gestational sac excision in four cases (40%) which is supported by a recent evidence that any method removes the trophoplastic tissues and scar can reduce morbidity and promote future fertility (Glenn*et al*., 2018).Dilatation and uterine evacuation done in two cases which require blood transfusion and use of uterine balloon to control bleeding followed by the use of methotrexate, one of these cases got another intrauterine normal pregnancy after completion of her followup, similarly seen in the study done by (Jurkovic*et al*., 2003).Laparoscopic and hysteroscopic approaches are also an options for resection(Glenn*et al*., 2018),it has never been done in our hospital. Regarding the medical treatment,there were two cases where both of them were given systemic methotrexate as a primary option, both cases were followed up by HCG level and TVUSS that they ended up with good response, and one of them had normal intrauterine pregnancy ended with a full term delivery. The use of MTX provides a choice of treatment in stable patients who wish to preserve their fertility(FulyaCagli *et al*.,2023)local methotrexate is not applied in these cases.In comparison with (Yamaguchi, Ohba and Katabuchi,2022)were they tried local methotrexate followed by D&C. and they concluded that it was effective and safe for CSP , also reduces the risks of complications. Others used combined intramuscular and intragestational methotrexate injection (ping peng*et al*., 2015).Treatment done with systemic methotrexate (Michenerand Dickinson, 2009)in seven cases with five (71.4%) requiring no further intervention. One case received intragestational sac and systemic methotrexate with a delayed hysterectomy as a result of molar complications. Two cases were treated with uncomplicated curettage and three by hysterectomy. Four women are known to have had pregnancies following the CSP.

Expectant management applied for one case with viable CSP after counselling and discussion with the patient for termination of pregnancy, who chose to continue her pregnancy that resulted in term pregnancy, complicated by invasive placenta which ended by cesarean hysterectomy. While in in a study done by (Jurkovic*et al*., 2003) expectant management was applied for three cases who experienced prolonged bleeding, severe hemorrhage in one case at 17 weeks, hysterectomy was done and prolonged bleeding in the other cases in which systemic methotrexate was used

5.Conclusions:

Previous uterine scar is the main risk factor for CSP, no specific clinical features for CSP. Transvaginal sonographay plays very important role for diagnosis.

CSP with positive fetal heart activity, which managed expectantly, was associated with a high maternal morbidity including severe hemorrhage, hysterectomy and maternal death. so early diagnosis and management play an important role in avoiding complications.

Surgical treatment appeared to be the most treatment option used and limited to uterine evacuation and open excision while dilatation& curettage were associated with high

risk of severe bleeding & blood transfusion and hysterectomy. Finally regarding the use of methotrexate there was no clear description of its protocol.

Recommendation

Woman with history of cesarean delivery should be screened in the first trimester for CSP .

Increase of obstetricians awareness and knowledge of the risks, diagnosis and treatment of CSP.

For high diagnostic accuracy, a careful TVUSS assessment and use flow Doppler is recommended.

Timely evidence-based management is crucial for preventing significant morbidities and preserve fertility.

We recommend larger prospective studies for assessing the incidence & to investigate the efficacy and safety of the various methods used in the diagnosis and treatment of CSP.

Author Contributions

Muna I. Al Shawbaki , Fawzia H. Harary and data collection, manuscript writing; Dr. Amina Abdulla Alshekteria for Data analysis and interpretation; Aziza Elgathafi supervision
All authors have read and agreed to the published version of the manuscript

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Ethical consideration

A formal letter: from Department of Obstetrics and gynecology send to the medical affair office at Benghazi medical center for obtaining a permission for conduct the study. The name of the patients kept confidential.

Conflicts of Interest

In this study, there is no conflicts of interest.

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