Case report
Successful pregnancy after early luteectomy
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Abstract
A 31-year-old women, para 1, was admitted with acute lower abdominal pain. Examination revealed a tender right adnexal mass confirmed by endovaginal ultrasonography. She reported a regular menstrual cycle of 30–31 days and was on day 31 of her cycle on admission. All laboratory results were normal and a urinary pregnancy test was negative. After 2 days a laparotomy was performed and an oophorectomy was carried out because of a bleeding ruptured right ovarian cyst. Histologic examination reported a haemorrhagic corpus luteum. Eight weeks after laparotomy a viable intra-uterine pregnancy was observed and finally a 3850-g healthy male was delivered. An oophorectomy at a corrected gestational age of 30 days did not disturb the course of the pregnancy.

Keywords: Corpus luteum surgery; Luteo-placental shift; Pregnancy

1. Introduction

It is generally accepted that prior to the seventh week of pregnancy the corpus luteum is indispensable for pregnancy maintenance [1]. The period during which steroidogenesis by the corpus luteum is overtaken by the trophoblast, the so-called luteo-placental shift, starts at the sixth week and is completed at the ninth week of pregnancy [2].

Luteectomy performed before the luteo-placental shift has taken place provokes abortion unless progesterone is being replaced [2,3]. Animal studies in different species confirm the crucial role of early progesterone production for normal reproduction [4]. Recent data derived from oocyte donation programs involving patients with primary ovarian failure (POF), have shown that placental production of progesterone may occur before the seventh week of gestation [5,6]. However, at what gestational age placental steroidogenesis is so far advanced that it is sufficient for pregnancy maintenance, is still a debatable issue. We present a case report in which oophorectomy containing the corpus luteum of pregnancy performed in the fifth gestational week did not disturb the course of the pregnancy.

2. Case report
A 31-year-old woman, para 1, was admitted because of acute lower abdominal pain. She had a regular cycle of 30–31 days; her last menstrual period started 31 days before and was described as normal. She used no contraceptives. At physical examination a tender right adnexal mass was found and endovaginal ultrasonography confirmed a 7- x 8-cm echogenic mass. There was a small amount of free fluid and on the left side of the uterus a 2- x 3-cm solid ovary was seen. The uterus appeared to be normal with a hyperechoic pattern of the endometrium.

Laboratory results were unremarkable: a sensitive pregnancy test (Abbott testpack, Amstelveen, The Netherlands) performed on her urine, was negative. After an initial recovery the pain recurred and because a torsion or a malignancy were considered as possibilities the conservative approach was abandoned and a laparotomy was performed on day 33 of her cycle. A bleeding ruptured right ovarian cyst was found and an oophorectomy was carried out. The left ovary was rather small and had a normal appearance without cystic structures.

After the laparotomy the patient noticed some vaginal bleeding, which at that time was interpreted as the
beginning of a normal but slightly delayed menstruation.

Histopathology reported a ruptured haemorrhagic corpus luteum cyst with no evidence of endometriosis. The post-operative course was uncomplicated and she was discharged 1 week after operation. Eight weeks later at a routine gynaecological follow-up visit, a soft and enlarged uterus was palpable. Ultrasonography showed a viable intrauterine pregnancy with a crown-rump length (CRL) of 62 mm (gestational age, 12.5 weeks), and a biparietal diameter (BPD) of 21 mm (gestational age, 12 weeks). After an uncomplicated pregnancy she was delivered of a 3850 g healthy male at a gestational age of 39 weeks and 3 days.

3. Discussion

In this case report all clinical data are consistent with a gestational age of 30 days on the day of the oophorectomy.

The accuracy of CRL and BPD in the first trimester has been extensively studied. A CRL measurement obtained from 7 to 13 weeks is considered to be the most accurate for establishing fetal age [7]. Others evaluated first trimester CRL and BPD and found both to be accurate to within ±4.6–5.0 days. When combined their accuracy increased to ±3.9 days [8].

Based on recommendations by the British Medical Ultrasound Society the curves of Robinson and Fleming for CRL and Hadlock et al. (1982) for BPD were used for the assessment of gestational age [7].

In this case ultrasonography confirmed the menstrual dating of the pregnancy. The small amount of blood loss after the laparotomy was retrospectively described as an abnormal menstruation. It was probably caused by decreased levels of progesterone after the luteectomy.

It was erroneously assumed on the day of admission that the negative urine pregnancy test had excluded a pregnancy.

The Abbott testpack is claimed to detect hCG concentrations of 50 mIU/ml or more. In the first weeks of pregnancy, plasma hCG concentrations rise to a mean level of 89 IU/L (±2 S.D., 3–140) on day 14 and 159 IU/L (±2 S.D., 100–252) on day 15, following the LH peak [10].

Although concentrations of intact hCG in blood and first morning urine are highly correlated (r = 0.64) and approaches unity in early pregnancy, the index of determination (r²) is only 0.41, implying that hCG detected in urine is a relatively poor predictor of hCG in serum [11]. Therefore, at this time of gestation, a negative pregnancy test does not exclude higher plasma hCG values. According to the manufacturer of the Abbott testpack, the sensitivity of the test is 99.3% and false negative results can occur. In our case report, the test was not performed on a concentrated first morning urine sample. We conclude therefore that a negative hCG urine test on the day of the expected menstrual period, especially when performed on unconcentrated urine, does not exclude a pregnancy.

The corpus luteum is responsible for a reasonable number of emergency operations because an ovarian cyst, especially in pregnancy, predisposes to rupture. A ruptured corpus luteum is usually found in the right ovary. This is explained by the relative protection of the left ovary against trauma by the rectosigmoid [12,13].

In the literature there are several reports of successful pregnancy outcome after early luteectomy. Csapo and Pulkkinen reviewed the earlier reports and stated that 10% of pregnancies were maintained because of an accessory corpus luteum [2]. In our patient no accessory corpus luteum was detected by ultrasonography or at the time of laparotomy, making its presence unlikely.

More recently Rabinerson et al. [14] described the persistence of a pregnancy after ovarian cystectomy 28 days after the last withdrawal bleeding. However, ultrasound examination performed at a gestational age of 7 weeks did not mention measurement of CRL nor fetal heart motion and because the pregnancy was terminated at this time the development of a successful pregnancy could not be proven.

In comparison with surgical luteectomy studies using progesterone antagonists causing medical luteectomy indicate that treatment starting within 10 days after the missed menstrual period did not prevent continuation of pregnancy in 15% of the cases. However, the mechanism by which progesterone antagonists interrupts pregnancy is not fully understood [1].

Recent studies have slightly altered some aspects regarding the classic concept of the luteo-placental shift. Pregnancies achieved via oocyte donation programs involving patients with POF provide a near ideal model for determining the onset of placental steroidogenesis, because the necessary administration of estradiol (E₂) and progesterone (P) results in constant serum levels. In such a model, any significant increase of these hormones reflects placental contribution.

Devroey et al. [5] found a significant rise of E₂ at 7 weeks and of P at 9 weeks gestation in substituted POF patients. The shift from luteal to placental hormone production is not limited to P but also applies for E₂ [5].

In a study of similar design, Scott et al. [6] demonstrated that E₂ and P of placental origin is detectable within 4 weeks of conception. Regression analysis of the E₂ and P values was highly linear, with the regression lines intersecting with basal levels during the fifth gestational week, approximately 3 weeks earlier than previously reported.

This case report documents a very early luteectomy followed by successful pregnancy. Why spontaneous abortion did not occur cannot be fully explained, even
when the latest insights into luteo-placental shift are considered.

Our report seems to support the hypothesis of Scott et al. that the placental steroid production begins as early as the fifth week of pregnancy [6], which in exceptional cases may be sufficient for pregnancy maintenance.

References


