

## Case Report

# Concurrent ultrasound-guided potassium chloride and systemic methotrexate injection in ectopic pregnancies with high B-HCG titers and fetal cardiac activity: Non surgical management of two cases

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## Abstract

Methotrexate (MTX) is an accepted regimen for conservative treatment of unruptured ectopic pregnancy. However, gestational sac greater than 3.5 cm, existence of cardiac activity and high titers of serum beta human chorionic gonadotrophin (B-HCG) levels are relative contraindications of Mtx treatment. A 29-year-old, gravida 3, parity 1 and a 34-year-old nulliparous women presented with a complaint of secondary amenorrhoea with a B-HCG value of 45,331 and 19,456 mIU/mL, respectively. Transvaginal ultrasonography revealed that an ectopic gestational sac in the adnexa with fetal cardiac activity. We applied ultrasound-guided local potassium chloride injection and single dose systemic MTX. Concurrent use of local injection of KCL and systemic MTX could potentially improve outcome in ectopic pregnancies with high serum B-HCG titers and cardiac activity. Unruptured ectopic pregnancies with cardiac activity can be successfully managed with concurrent usage of local KCl injection and systemic MTX without surgical intervention.

## Key Words:

Ectopic pregnancy, local KCl injection, metotrexate, serum B- HCG

## Introduction

An ectopic pregnancy occurs when the fertilized oocyte implants outside the endometrial cavity. The incidence of ectopic pregnancy has increased in recent years, reaching 1-2% of all pregnancies [1]. Along with the improvement of ultrasound equipment as well as the quantitative study of the B-HCG, the diagnosis of ectopic pregnancy can be made easily before the patient becomes symptomatic [2]. Early diagnosis has enabled the improvement of laparoscopic treatment and subsequently medical treatment [3]. The classical treatment of ectopic pregnancy is surgical resection of tube, ovary or cornual region of the uterus containing gestational sacs. Conservative or non surgical approaches have been described recently including the sys-

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temic methotrexate injection [2]. Systemic MTX treatment is useful in early, unruptured, tubal ectopic pregnancies approximately with a success rate of 90% [4,5]. However, systemic MTX alone is not so successful in tubal ectopic pregnancies with cardiac activity, with a failure rate of 3% [5]. Although MTX is accepted a treatment modality for conservative management of ectopic pregnancies, there is no consensus about its usage in ectopic pregnancies with cardiac activity and high serum B-HCG levels [6]. In the current report, we present two cases of ectopic pregnancies with high B-HCG levels and cardiac activity who were successfully treated by concurrent ultrasound-guided local potassium chloride injection and one dose of systemic MTX injection.

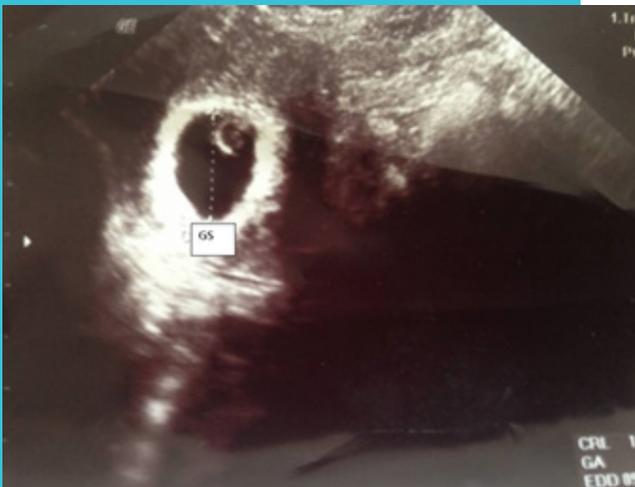
## Case Presentation

### Case 1

A 29-year-old, G3 P1 woman came up with complaints of amenorrhoea and lower abdominal pain. Her previous menstrual cycles were regular. Vital signs of patient were stable,

and abdomen was soft with mild suprapubic tenderness on palpation. Transvaginal –ultrasonography revealed an empty uterine cavity with an ectopic gestational sac (measuring 25 mm X 25 mm) in left adnexa with an embryo and positive cardiac activity, corresponding to 7 weeks of gestation (Figure 1). There was no free fluid in the pelvis and the serum B-HCG level was 45.331 mIU/mL. Left tubal ectopic pregnancy with cardiac activity was diagnosed and surgical intervention was recommended to the patient. Since the patient refused operative intervention, we decided to apply intrasac KCl instillation prior to systemic MTX injection. The risks and benefits were discussed with the patient and written consent form were taken. Under transabdominal ultrasound guidance using a 21 gauge spinal needle, 1 mL of 2 mEq/mL KCl was instilled into the ectopic sac and cardiac asystol were achieved. After checking normal complete blood count, liver and kidney function tests, intramuscularly one dose of 90 mg MTX (50 mg/m<sup>2</sup>) was administered in the same day. Serum B-HCG titers were taken on day 4 and 7 after MTX injection. Her B-HCG level was 35.675 mIU/mL on fourth day and 20.000 mIU/mL on seventh day. The decline in HCG titers was adequate and then the patient was followed weekly. Serum B-HCG titers became negative (<5 mIU/mL) on 30th day of follow up.

**Figure 1.**



*Alive ectopic pregnancy in left adnexa*

**Figure 2.**



*Alive ectopic pregnancy in the left adnexa*

## Case 2

A 34-year-old nulliparous woman with a history of infertility came up with a complaint of amenorrhoea. The serum B-HCG level was 19.456 mIU/mL. In ultrasonographic examination we observed an ectopic gestational sac (20mm X 20mm) and embryo with cardiac activity in left adnexa corresponding to 6 weeks of gestation (Figure 2). There was an empty uterine cavity, endometrium thickness was 8 mm and no free fluid in the douglas. Surgical treatment was recommended, but the patient did not accept operation. The risks and benefits were discussed with the patient. With the consent of patient we implemented ultrasound guided intrasacular injection of 1 ml of 2 mEq/mL KCl by a 21-gauge spinal needle and intramuscular one dose of 75 mg (50 mg/m<sup>2</sup>) systemic MTX in the same day (Figure 3). Serum HCG titres were taken on day 4 and 7 of MTX injection. The patient's B-HCG titer was measured 14.513 mIU/mL on fourth day and 8.540 mIU/ mL on seventh day. B-HCG titers declined sufficiently and we followed the patient weekly. Successful resolution of ectopic pregnancy with negative serum B-HCG (< 5 mIU/mL) was achieved about five weeks later.

## Discussion

Treatment options for ectopic pregnancy consist of surgery, systemic MTX injection and ultrasound guided local injection of MTX or KCl [6]. Mtx has been used in the medical treatment of ectopic pregnancies since the 1980s, either administered by intramuscular injection systematically or locally injection via laparoscopy or under ultrasound guidance [7]. Success of treatment changes according to used treatment regimen, gestational age and B-HCG levels. Large gestational sac, existence of cardiac activity and high titers of serum B-HCG are relative contraindications of MTX treatment. These patients have low success rates. Several observational studies reported a failure rate of 14.3% or higher with single dose MTX when B-HCG levels are higher than 5.000 mIU/mL, compared with a 3.7 % failure rate for B-HCG levels less than 5000 mIU/ml [6]. Methotrexate can be only option for some women refusing surgery who had salpingectomy history before and desire to preserve future fertility, and who have ectopic pregnancies with high B-HCG levels and cardiac activity. Tubal rupture and treatment failure are rather high for patients treated with MTX alone. Because local KCl injection causes cardiac asystole, MTX treatment may be more effective. Our patients responded well to treatment without complications. In a randomized clinical trial it was shown that multiple doses of MTX may be required if B-HCG levels are higher than 5000 mIU/mL [8]. In our cases, even if we make medical treatment, the ectopic gestational sac could have rupture and operative treatment could be inevitable but we had successful results with ultrasound guided intrasac KCl injection and single dose of MTX. Firstly, Aboulghar *et al.* reported a case of tubal pregnancy with cardiac activity managed by transvaginal ultrasound guided intrasac KCl injection and MTX [9]. Also Verma and Jachues reported successful management of three tubal pregnancies with cardiac activities by using ultrasound guided intrasac injection of KCl and single dose MTX. The HCG levels in their cases were 102,953; 58,423 and 41,363 mIU/ml [10]. In a selected patient population, many types of ectopic pregnancies with cardiac activity (cervical, cornual, or caesarean section scar ectopic pregnancy) can be successfully managed by using ultrasound guided injection of KCl and Mtx without surgical intervention [2,11]. In conclusion, the likelihood for successful outcome with the conservative management of ectopic pregnancy seems high in cases with early gestation and low HCG titer. It is

**Figure 3.**



*Ectopic pregnancy with no cardiac activity after KCl instillation*

likely that patients with advanced gestational age and high B-HCG titer may require more than one dose of Mtx after initial procedure. Our results demonstrated that some patients with high B-HCG titers and advanced gestational age can be successfully treated with conservative management. Concurrent usage of intrasac KCL injection with systemic MTX injection could potentially improve outcome in ectopic pregnancies with high serum B-HCG titres and cardiac activity. This conservative approach may be helpful in management of patients who refuse surgery and has unruptured ectopic pregnancy with cardiac activity.

**Acknowledgement**

None

**Declaration of Interest**

None

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