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Plasma Prostaglandin Concentration after Cervical Cerclage and after Transvaginal Ultrasound Examination during Pregnancy

*Hassan S Jamal**

Objectives: 1) To investigate whether cervical cerclage technique at different gestational age could raise the peripheral plasma level of 13, 14 dihydro-15 ketoprostaglandin F (PGFM) to a significant level. 2) To investigate the relation between the magnitude of elevation of PGFM and cases of difficult insertion and long duration of procedure of cervical cerclage. 3) To investigate the risk of transvaginal ultrasound examination in elevating the prostaglandin $F_2\alpha$.

Design: Clinico-chemical prospective study.

Setting: King Abdulaziz University Hospital, Jeddah, Saudi Arabia

Subjects: 35 patients having cervical cerclage at different gestational ages ranging from 14-22 weeks and another group of 15 patients having transvaginal ultrasound examination at similar gestational age.

Intervention: Peripheral plasma level of 13, 14 dihydro-15 ketoprostaglandin F (PGFM) was measured before and after each procedure.

Main Outcome Measures: Change in the level of Serum PGFM after the procedure.

Results: A significant level of elevation of PGFM was found when cervical cerclage was inserted particularly with difficult insertion and longer duration of the procedure. There were no significant changes in PGFM after transvaginal ultrasound examination.

Conclusion: Despite significant elevation of PGFM, there were no significant uterine contractions to justify the routine use of tocolytic drugs with cervical cerclage. There is no risk of transvaginal ultrasound examination performed during pregnancy.

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Cervical incompetence is a syndrome defined as painless, progressive dilatation and effacement that occurs between the sixteenth and twenty fourth week of gestation[1,2]. It has been considered as one of the important causes of spontaneous habitual abortion, mid-trimester abortion and early pre-term labor. Cervical incompetence if left without treatment, may lead to sudden rupture of the amnion and chorion, followed by rapid expulsion of the fetus[3, 4] . Incompetence of the internal os occurs in 0.05 to 1 percent of all pregnancies[5,9]. This problem accounts for 0.2 percent of all abortions and 16 to 20 percent of abortions in the second trimester[10]. Among patients with a history of habitual abortion, the incidence of cervical incompetence is approximately 12%[11]. Recently, transvaginal ultrasonography has been introduced as a new tool for examining the cervix[12]. A shorter or dilated cervix often predicts premature delivery in a patient at risk for this condition[13]. In one population based study, it was suggested that shortening of the cervix at 24 and 28 week is associated with premature delivery[14].

Cervical cerclage procedure may be performed to treat this cervical incompetence. Some authors showed elevation of prostaglandin after the insertion of cerclage while others failed to show that effect[15, 16].

This study was designed, firstly, to establish the risk of using transvaginal ultrasound examination during pregnancy and its effect on the circulating levels of prostaglandin $F_2\alpha$. The second aspect studied was whether cervical cerclage performed at different gestational ages could raise the circulating levels of PGFM with the risk of stimulating uterine contractions and the need to give tocolytic drugs. The relation between the magnitude of elevation of PGFM and

* Consultant & Associate Professor
Department of Obstetrics & Gynecology
King Abdulaziz University Hospital
Jeddah, Saudi Arabia

difficult cases with longer duration of the procedure was also studied.

METHOD

We classified our patients into two groups. The first group (n=15) underwent transvaginal ultrasound examination at gestational age between 14 -22 weeks. The second group (n=35) underwent cervical cerclage under general anesthesia at nearly similar gestational age ie. 14-22 weeks. All patients had singleton pregnancy without significant medical or surgical disease. Informed consent to take blood samples was obtained from all patients. Follow-up of these patients has been achieved for 12 weeks after sampling without any significant complications.

Transvaginal Ultrasound Group: (n=15)

These patients had a blood sample taken 5 minutes before the transvaginal ultrasound examination and another sample 5 minutes after the examination. Transvaginal ultrasound examination was carried out in the ultrasound department using a vaginal probe. The idea behind using vaginal ultrasound was to see if stimulation of the cervix by touch had any relation to the release of prostaglandins $F_2\alpha$.

When blood sample was collected, it was kept into ice cold tubes containing chemical of ethylenediamine tetra acetic acid and acetylsalicylic acid. All blood samples remained in ice until plasma was separated by centrifugation.

Plasma was stored at -20^0C until analysis. Specific radioimmunoassay as described before by Mitchel *et al* in 1978 was used to measure the PGFM. The (^{3}H) prostaglandin $F_2\alpha$ radioimmunoassay kit is based on competitive binding principles of radioimmunoassay. To eliminate protein interference in the assay, a protein denaturation is performed in all samples. Extraction followed by column separation of prostaglandins is done. The amount of tracer that is bound to the antibody of non-radio active prostaglandin in the assay tube. Antibody bound prostaglandin was in separated form.

Cervical Cerclage Group: (n=35)

In this group, patients were eligible for the study if they met the following criteria:

1. Two, or more previous pregnancies which had ended spontaneously before 37 completed weeks.
2. At least one previous pregnancy had ended spontaneously between 14 - 36 weeks.
3. Cervical shortening during pregnancy.

All cerclage patients had the suture by the McDonald technique. Suturing of the cervix was performed by means of a Merselene NoC 4 suture around the ectocervix as high as possible preferably at the level of the internal os. The suture was started anteriorly and with five penetrations into the cervical body, the cervical canal was encircled, thus decreasing its diameter to a few millimeters. The suture was tied at 12 O'clock position.

The indications for cervical cerclage varied and are shown in Table 1.

Table 1: The indications for cervical cerclage group (n = 35)

Indications / Reason for Cerclage	*Number of Patients*
Spontaneous Mid-trimester Abortion	25
History of Premature Labor	7
Cervical changes during Current Pregnancy	3
Total	35

Blood samples were taken from maternal antecubital vein before induction of general anesthesia 5 minutes after induction and 5 minutes after completing the procedure. Statistical differences were computed using the Wilcoxon Signed Rank Test.

RESULTS

Plasma concentration of PGFM (Mean ± SEM) were not changed significantly by transvaginal ultrasound examination during pregnancy. The levels were 72.2 ± 8.5 pg/ml before and 73 ± 6.3 pg/ml after the examination (P >0.1) as shown in Fig 1.

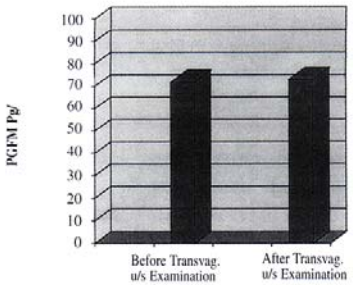

Fig.1. Plasma PGFM concentration (Mean ± SEM) before and after transvaginal ultrasound examination