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Pharma Conference 2020: Effects of oxytocin and misoprostol for labor induction on umbilical cord blood gas parameters – Narantungalag - Mongolian National University of Medical Science, Mongolia.

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To compare the effects of oxytocin and misoprostol used in labor fetal blood gas parameters. This prospective randomized trial involved 60 women who completed 37-42 gestational weeks and who required labor induction prior to normal vaginal birth. Labor was induced in 30 women with an intravenous low dose oxytocin regimen and in 30 with intravaginal misoprosrol (PGE1). Following childbirth, umbilical artery blood gas was analyzed, with pH, pCO2, pO2, HCO3 and base excess (BE) compared in the two groups. Mean age and obstetrical data (gravidity, parity, gestational weeks and birthweight) were similar in the two groups (p>0.05). All infants had 1 and 5 minute APGAR scores ≥7. Umbilical artery blood pH was similar in the oxytocin and misoprostol groups (7,30±0,08 vs. 7.32±0.05, p=0.781), as were the other blood gas parameters (pCO2, pO2, base excess and HCO3; p>0.05 each).

Induction of labor with either oxytocin or misoprostol in women with uncomplicated term pregnancies had no adverse effects on umbilical artery blood gas parameters.

Induction of labor refers to the process whereby uterine contractions are initiated by mechanical or pharmacological methods before the onset of spontaneous labor[1]. Induction of labor is advised in situations when the pregnancy is dangerous for the mother or fetus; or when induction is beneficial for both. Induction of labor decreases operative labor and minimizes risks to the fetus. Among the factors influencing the method used to induce labor are cervical and membrane status, parity, and patient and provider preferences[4]. The ideal method should be safe, painless, inexpensive, comfortable and effective. The most common pharmacological agents are oxytocin and prostaglandins (PGE1 and PGE2). Oxytocin is a safe and efficient starter of uterine contractions, but its success is associated with the condition of the cervix at the start of the labor. Misoprostol (methyl II, 16-dihydroxy-16-methyl-9-oxoprost-13E-en-oate), a synthetic prostaglandin E1 analogue, is a gastric cytoprotective agent and is used for labour induction, especially in patients with an unripe cervix. Published meta-analyses have stated that women who received misoprostol for labour induction had a higher rate of vaginal delivery within 24 h of induction and a lower Caesarean rate than women in whom labour was induced by other methods. If labor is not induced under acceptable indications and surroundings, the uterus may be overstimulated, causing it to contract too frequently. Too many contractions may lead to changes in fetal heart rate and result in fetal distress[2]. We therefore compared the effects of oxytocin and misoprostol on fetal blood gas parameters.

This prospective case–control study was conducted at the Obstetrics and Gynaecology Department of National maternal and Child Health Center, Mongolia. A total of 60 women were enrolled. The women considered eligible for the study had singleton term (37–42 weeks) pregnancies and had given birth by vaginal route within 24 h after induced labour with misoprostol or oxytocin; none of them had a rhesus negative blood group or any known medical disease or foetal problem such as birth trauma or asphyxia that complicated the pregnancy. Women with Bishop Scores ≤ 5 were given misoprostol and women with scores above this had received oxytocin. All deliveries were electronically monitored. The neonates were not included in the study if there was foetal distress or if there were any side effects related to the drugs. The First group consisted of 30 healthy babies of women who received oxytocin infusion starting from 2 mIU/min, increasing the dose by 2 mIU/min increments every 20 min to a maximum of 30 mIU/min in 0.9% saline. The second group consisted of healthy babies of 30 women who received 25 µg misoprostol every 4 h placed in the posterior fornix of the vagina. Following vaginal birth, the umbilical cord was clamped, and a 2 cc blood sample was drawn from the umbilical artery

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within 30 seconds. Blood gas samples were analyzed for pH, pCO2, pO2, HCO3 and base excess (BE), while obeying the rules of cold chain. One and five minute APGAR scores of each newborn were recorded.

This study protocol was approved by the Local Ethics Committee of our Hospital, and all subjects provided informed consent.

Statistical analysis was performed using SPSS software. A one-way ANOVA *F* test was used for the comparison. $P < 0.05$ indicated statistical significance.

The mean age of all women enrolled in this study was 26.5±5.05 the mean gestation age was years, and 39.85±0.68 weeks. The demographic and obstetrical data of the two groups were comparable (p>0.05 each; Table 1). All infants had 1 and 5 minute Apgar scores ≥7. Comparisons of umbilical arterial blood gas pH, pCO2, pO2, HCO3 and BE showed no differences between the oxytocin and misoprostol groups (p>0.05 each; Table 2).

Also there was no significant difference between oxytocin and dinoprostone groups in pH, pCO2, pO2, HCO3 and BE values in umblical artery blood gas analyzes (P> 0.05). Three of the neonates in the oxytocin group and 2 of the neonates in the dinoprostone group were admitted to the neonatal intensive care unit and no significant difference was found between the groups (Table 2). All newborns admitted to intensive care unit were discharged together with their mothers in good health. COVID-19–infected patients has been growing rapidly, and many are currently being tested or indeed used clinically in critically ill patients. At present, there are more than 200 registered clinical trials involving COVID-19 patients. Conventional drug development paradigms and trial designs do not fit well with the urgency and limited window of opportunity at the individual patient level and scale of the crisis. The clinical pharmacology remit to get the right drug and indeed “the right dose in every patient” has never been clearer, but in the context of the COVID-19 pandemic we need to add “as soon as possible.” Patients in greatest need may not have the time to benefit from an overly cautious approach, whereas they may also be at highest risk of experiencing exaggerated and previously unknown adverse events. A major challenge at present is, of course, that the evidence for clinical efficacy in COVID-19 is very sparse for any pharmacological treatment. However, clinical pharmacologists have a wealth of knowledge about approved drugs, many of which are currently in clinical trials for repurposing. This knowledge can be harnessed and translated immediately to optimize dosing and treatment regimens.

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