Do Cervical Intraepithelial Neoplasia (CIN) and Human Papilloma Virus (HPV) Infection Predispose to Uterine Tachysystole When Double Balloon Catheter (DBC) is Considered for Cervical Ripening? Case Report

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Introduction

Induction of labour is very common in current obstetric practice. In the UK, it happens in up to 20% of pregnancies[1]. There are different pharmacological and mechanical methods currently used for induction of labour. One of them is the Double Balloon Catheter (DBC), which was first described by Atad et al in 1991. In 2005, FDA approved the "Atad Ripener device " , made of natural latex. In 2013, the DBC, made of silicone, was approved by FDA[2].

There is a lot of evidence comparing safety and effectiveness of different methods for induction of labour and cervical ripening in literature, and there is almost a consensus that DBC is associated with lower risk of uterine tachysystole when compared with prostaglandins[2,3&4]. 96 RCTs were included in a meta-analysis published in BJOG in February 2016 to compare different methods used for cervical ripening during induction of labour. The mechanical method studied in this meta-analysis was the Foley single balloon, not DBC. Authors concluded that the use of Foley catheter was associated with the lowest rate of hyperstimulation accompanied by fetal heart changes[5].

It is understandable that induction of labour on its own is a risk factor for tachysystole, and that certain conditions increase its likelihood, such as hypertension [6&4], but are there risk factors that make tachysystole more likely to happen specifically when DBC is used? We couldn't find an answer for this question in the literature.

In this article we are presenting a case of uterine tachysystole that happened after insertion of DBC. The woman has had CIN and HPV infection before pregnancy.

Case Presentation

We are presenting the case of a primigravida lady, who had history of CIN grade 1, along with cervical HPV infection in 2014 which were conservatively managed. Follow up colposcopy and cervical smears were normal, and so she was back to 3 yearly smears.

She got pregnant in 2018 and had uneventful antenatal care until gestational age 38 weeks+5 days, when she developed mild preeclampsia. Non-stress test and blood results were normal.

Case Presentation- cont.

She was started on labetalol and had DBC for induction of labour at 38+6 with a Bishop score of 3. After 4 hours, she was contracting at a rate of 6 in 10 minutes, with minimal rest in-between the contractions, with no significant fetal heart rate (FHR) changes in cardiotocography (CTG). DBC was removed, and no tocolytic was needed, and she rested overnight.

The following morning, she had 10 mg of dinoprostone, in the form of vaginal delivery system, with a Bishop score of 4, which lasted for 24 hours. Then she had another 3 mg of dinoprostone as a vaginal suppository, with a Bishop score of 5. Contractions were infrequent. After 6 hours, her Bishop score was 8, and she had artificial rupture of membranes. Two hours later, contractions were augmented by oxytocin infusion. She progressed well and delivered a female baby vaginally 4 hours later. Estimated blood loss was 500 ml. Postnatally, Alanine Transaminase (ALT) went up to 98, but began to fall down to normal values shortly. She was discharged home on labetalol on day 4 postnatally.

Discussion

We understand that hypertension is a risk factor for uterine tachysystole[6&4], however this patient had uterine overactivity when the double balloon catheter was used, and such tachysystole didn't happen when different preparations of prostaglandin E2 and oxytocin infusion were used. This is interesting, because in one study oxytocin was found to increase risk of all tachysystole events by 2- to 3- fold, and there was a dose-response correlation between them[6&4].

In a large meta-analysis including 71 studies assessing obstetric outcomes after treatment for CIN, it was noted that despite cervical treatment being associated with worse obstetric outcomes, in terms of preterm labour, premature rupture of membranes and chorioamnitis, the rate of induction of labour (with or without oxytocin) was not affected by treatment[7&4]. However, the effect of CIN treatment on risk of uterine tachysystole has not been questioned.

Recommendations

Whether or not uterine tachysystole, with or without FHR changes, can be triggered with the use of double balloon catheter in women with history of CIN and/ or HPV is not clear in literature, and we believe that what has been observed in this case should prompt further research into the risk factors of uterine tachysystole in the cohort of women receiving DBC for cervical ripening, and the pathophysiological causes behind this.

Acknowledgements

- Patient has given her informed consent to publish her case.
- No conflicts of interest have been identified.
- We would like to thank Ms Sarah Gardner, Clinical librarian in Bassetlaw District General Hospital, who has helped us with literature review.
- This work has been presented for York Medical Society Founder's prize meeting on 5th April 2019 (oral presentation).

References

1. National Institute for Health and Care Excellence Interventional procedures guidance (IPG528). *Insertion of a double balloon catheter for induction of labour in pregnant women without previous caesarean section*. July 2015

2. Chodankar R, Sood A, Gupta J. An overview of the past, current and future trends for cervical ripening in induction of labour. *TOG The Obstetrician& Gynecologist* 2017;19(3):219-226.

3. Levine EM ed, van Zuuren EJ ed, Ehrlich A ed. Cervical ripening for labor induction with unfavourable cervix. *Dynamed Plus*.2019 http://www.dynamed.com/topics/dmp~AN~T922499/Cervical-ripening-for-labor-induction-with-unfavorable-cervix#GUID-2CEC200C-E566-450C-A3C8-ECEFD5C22414--GENREF5419.

4. Evidence search: Induction of labour and tachysystole following treatment for CIN, Sarah Gardner, 11.1.19 DONCASTER, UK: Doncaster & Bassetlaw Teaching Hospitals NHS Foundation Trust Knowledge, Library and Information Service.

5. Chen W, Xue J, Peprah MK et al. A systematic review and network meta-analysis comparing the use of Foley catheters, misoprostol, and dinoprostone for cervical ripening in the induction of labour. *BJOG* 2016;123(3):346-354.

6. Heuser CC, Knight S, Sean Esplin M et al. Tachysystole in term labor: incidence, risk factors, outcomes, and effect on fetal heart tracings. *AJOG* 2013;209(1):32-33

7. Kyrgiou M, Athanasiou A, Paraskevaidi M et al. Adverse obstetric outcomes after local treatment for cervical preinvasive and early invasive disease according to cone depth: systematic review and meta-analysis. *BMJ (Clinical research ed.)* 2016;354:i3633