

**Objective:** To study the role of ultrasound as a tool for predicting mode of delivery after induction of labor in primigravida.

**Design:** A prospective observational study

**INTRODUCTION**

Use of ultrasound for predicting outcome of Induction of labor (IOL) is an emerging field of patient evaluation which aims for assessing the maternal birth canal and its favorability for successful vaginal delivery without any complication.<sup>1</sup> On transvaginal ultrasound we can measure the cervical length ,effacement and position of internal OS. <sup>2</sup> The position and station of fetal head can also be evaluated by the ultrasound and being a non-invasive procedure the ultrasound assessment is comfortable to patients and chances of infections are less. We hypothesized that we would be in better position to predict vaginal delivery more objectively by using the ultrasound Henceforth, we planned this study.

**MATERIAL AND METHOD**

We evaluated 248 nulliparous women with singleton term pregnancy at Queen Mary Hospital Lucknow during period of 1 year (May 2019 – April 2020) who had induction of labour for various maternal and fetal indication out of which 54 were excluded because of various reasons like negative consent for further induction, failed induction and emergency LSCS for AFD before initiation of uterine contraction and finally 194 were recruited. These 194 primigravida women with singleton, term cephalic pregnancy and adequate pelvis, planned for induction of labor who consented for enrolment in this study were recruited and were followed up till delivery. The enrolled cases were evaluated through history, clinical and vaginal examinations followed by transabdominal, transvaginal and trans perineal ultrasound before induction of labor. They were divided into 3 groups based on the mode of delivery. Group 1 had normal vaginal delivery, Group 2 had instrumental vaginal delivery and Group 3 had caesarean delivery. The Data thus collected was analyzed using SPSS Version 21.0 statistical Analysis Software.



Fig. 1: Method of performing transperineal ultrasound

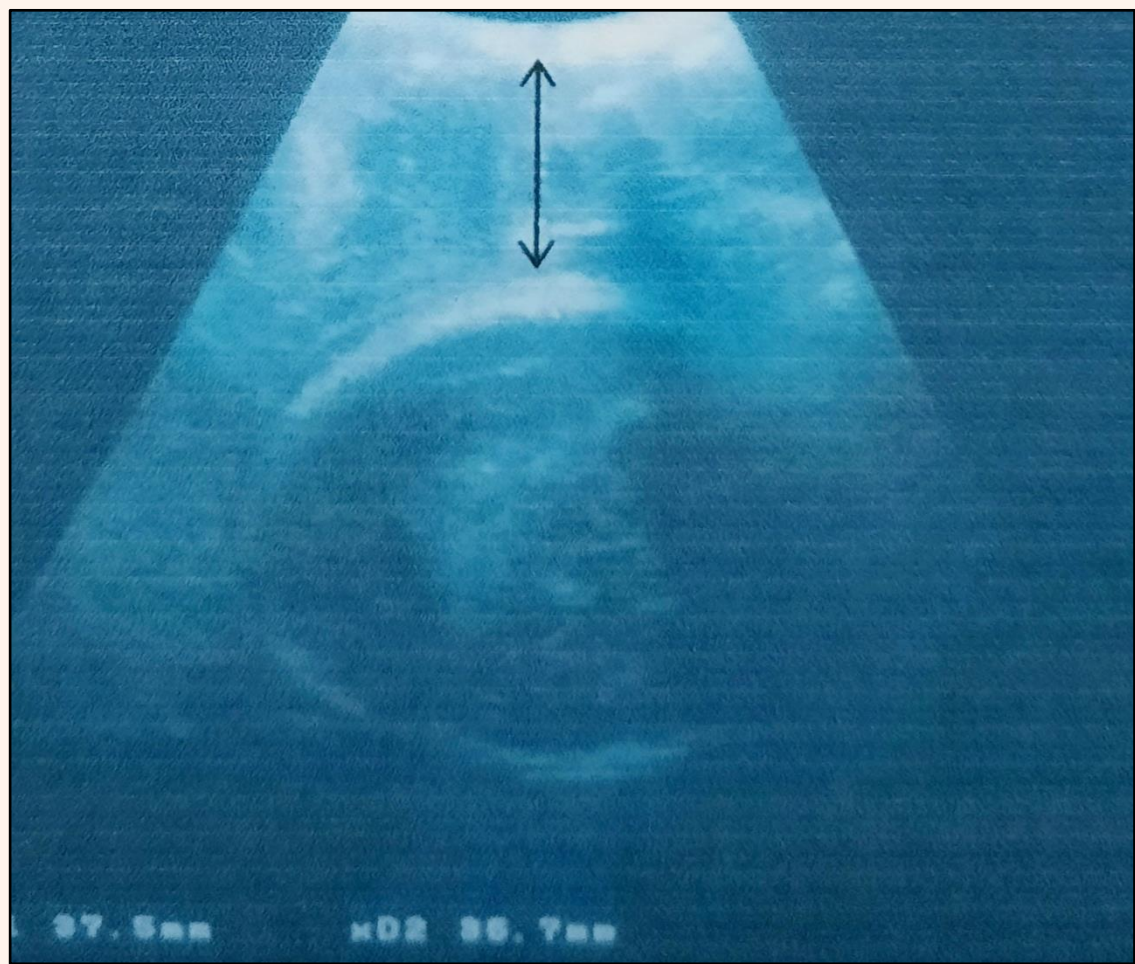


Fig. 2: Measurement of fetal head perineal distance of TPS

- RESULTS**
- Among 194 women 113(58.2%) had normal vaginal delivery,19(9.8%) had assisted vaginal delivery and 62(32%) had LSCS. The mean maternal age was 25.33 ± 3.61 years and mean BMI was 24.54 ±2.54.
  - Mean gestational age was 38 wk ± 7 days. The cutoff of perineal head distance in present study was ≤ 41.6mm for vaginal delivery. AUC was 0.688, 95% CI 0.606 to 0.769and p <0.001 and it was statistically significant. Majority of women had perineal head distance between 31mm – 40mm (60.3%).
  - It was observed that shorter perineal head distance was associated with more chances of successful induction and vaginal delivery as compared to longer perineal head distance which was associated with more CS due to non-progress and arrest of labor.
  - In the present study the cut-off of cervical length on TVS for vaginal delivery was ≤ 2.5 AUC 0.676,95% CI 0.597 to 0.759, p<0.001. The sensitivity and specificity of this cut off for vaginal delivery was 85% and 70% respectively. The percentage of OA position in Group1 was 90(79.6%) in the Group 2, 8(42.1%) and in Group 3, OA was 29 (38.7%).

| USG Parameters                  |                       | Group           |       |                |       |                |        | P Value |
|---------------------------------|-----------------------|-----------------|-------|----------------|-------|----------------|--------|---------|
|                                 |                       | Group 1 (n=113) |       | Group 2 (n=19) |       | Group 3 (n=62) |        |         |
|                                 |                       | N               | %     | N              | %     | N              | %      |         |
| Perineal head distance ( in mm) | <=30                  | 1               | .9%   | 0              | .0%   | 2              | 3.2%   | <0.001  |
|                                 | 31-40                 | 83              | 73.5% | 11             | 57.9% | 23             | 37.1%  |         |
|                                 | 41-50                 | 28              | 24.8% | 8              | 42.1% | 34             | 54.8%  |         |
|                                 | 51-60                 | 1               | 0.9%  | 0              | .0%   | 3              | 4.8%   |         |
| Cervical length (in Cm)         | 2 to 2.5              | 32              | 28.3% | 3              | 15.8% | 9              | 14.5%  | 0.001   |
|                                 | 2.6-3.0               | 70              | 61.9% | 13             | 68.4% | 32             | 51.6%  |         |
|                                 | >3                    | 11              | 9.7%  | 3              | 15.8% | 21             | 33.9%  |         |
| EFBW (in Gm)                    | <2500                 | 41              | 36.3% | 9              | 47.4% | 11             | 17.7%  | 0.002   |
|                                 | 2500-3000             | 59              | 52.2% | 8              | 42.1% | 31             | 50.0%  |         |
|                                 | >3000                 | 13              | 11.5% | 2              | 10.5% | 20             | 32.3%  |         |
| AFI (cm)                        | <5                    | 1               | 00.9% | 0              | 00.0% | 2              | 3.2%   | 0.235   |
|                                 | 5-10                  | 72              | 63.7% | 14             | 73.7% | 47             | 75.8%  |         |
|                                 | 10-20                 | 40              | 35.4% | 5              | 26.3% | 21             | 3.0%   |         |
|                                 | >20                   | 0               | 00.0% | 0              | 00.0% | 0              | 00.0%  |         |
| Fetal Head Position             | Occipito-Anterior     | 90              | 79.6% | 8              | 42.1% | 24             | 38.7%  | 0.001   |
|                                 | Non Occipito-Anterior | 23              | 20.4% | 11             | 57.9% | 38             | 61.29% |         |

| Table 1: Study Groups According To Mode Of Delivery After IOL |  |                 |         |  |  |  |
|---------------------------------------------------------------|--|-----------------|---------|--|--|--|
| STUDY GROUPS                                                  |  | Number of cases | Percent |  |  |  |
| Normal Vaginal delivery (Group 1)                             |  | 113             | 58.2%   |  |  |  |
| Assisted Vaginal delivery (Group 2)                           |  | 19              | 9.8%    |  |  |  |
| LSCS (Group 3)                                                |  | 62              | 32.0%   |  |  |  |
| Total                                                         |  | 194             | 100.0   |  |  |  |

| Table 3: Perineal head distance cut-off for vaginal delivery in different studies. |             |                                       |                 |             |             |         |
|------------------------------------------------------------------------------------|-------------|---------------------------------------|-----------------|-------------|-------------|---------|
| Study                                                                              | Sample Size | Criteria of study population          | Cut off (in cm) | Sensitivity | Specificity | P-value |
| Eggebo et al (2006) <sup>35</sup>                                                  | 152         | Primigravida & multigravida with PROM | <4.5            | 89.0%       | 74%         | 0.03    |
| Sarayo et al (2016) <sup>41</sup>                                                  | 323         | Primigravida & multigravida in APOL   | ≤4.35           | 91%         | 78%         | <0.001  |
| Mahmoud et al (2018) <sup>40</sup>                                                 | 149         | Postdated primigravida                | ≤4.65           | 92.7%       | 62.5%       | <0.001  |
| Present study                                                                      | 194         | Term primigravida                     | ≤4.16           | 91%         | 67.4%       | <0.001  |

**DISCUSSION**

The study supports that USG could be used as a successful predictive tool for predicting vaginal birth after IOL. Table 3 shows the comparison of results of other researchers with the present study. The successful vaginal birth is inversely proportional to the distance between fetal head and the perineum. USG is noninvasive which can help to assess the probability of vaginal birth by calculating cervical length, PH distance, position of fetus, amount of liquor, fetal weight along with bishop’s score at initial stage and can avoid multiple per vaginal examinations<sup>3</sup>.

**CONCLUSION**

Majority of the cases with longer perineal head distance and longer cervical length had delivery by LSCS after induction of labor. Occipito posterior position had significant association with difficult/assisted vaginal delivery and delivery by LSCS after induction of labor. Higher effective fetal birth weight on transabdominal ultrasound had more association with LSCS deliveries. So, we propose that combination of several ultrasound parameters including trans perineal USG can be used as a better predictor for outcome of induction of labor.

**REFERENCES**

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