

# Induction of Labour: Are We Inducing Mothers for the Appropriate Reasons and at the Correct Time?

Eng Loy Tan, Devendra Kanagalingam, Hak Koon Tan

## ABSTRACT

**Background:** Induction of labour (IOL) is a common procedure, involving about 20% of pregnant women. IOL presents challenges for both clinician and mothers as it involves complex interventions that may result in possible adverse outcomes.

**Aim:** To audit the practice of IOL in the Department of OB-GYN, Singapore General Hospital.

**Methods:** A retrospective review was carried out on all obstetric deliveries performed in the Department of OB-GYN, Singapore General Hospital in the years 2005 and 2006. All cases of IOL were identified. The indication for each labour induction, the method of induction, the gestational age at delivery, as well as the final outcome of each induction were examined. The data was then tabulated and statistically analyzed.

**Results:** A total of 3389 women underwent obstetric delivery between 2005 and 2006. Out of these deliveries, 505 (14.9%) underwent IOL. 447 (88.5%) of these cases utilized vaginal prostaglandins (Prostin E2) for IOL, while the remainder were induced by amniotomy. The most common indication for IOL was for post-date pregnancies (38%), followed by oligohydramnios (22.8%) and maternal diabetes mellitus (9.3%). The average gestational age at delivery for the three most common indications were 41.3, 38.9 and 38.2 weeks respectively. The average gestational age of delivery for all IOL cases was 39.5 weeks. 66.9% of IOL cases delivered spontaneously via the vaginal route. 23.2% were delivered by caesarean section. The remaining cases (9.9%) underwent operative vaginal delivery.

**Discussion:** Our rate of IOL of 14.9% compares favourably with the average quoted rate. The largest number of IOL were carried out for post-date pregnancies with a mean delivery gestation of 40.7 weeks. A significant proportion of cases were induced for oligohydramnios and delivered at an average gestation of 38.9 weeks. Examining the practice and diagnostic criteria for liquor volume assessment prior to 41 weeks may help to reduce IOL numbers in this group. Almost a quarter of IOL cases were delivered by caesarean section. Reducing the incidence of inappropriate IOL may help to reduce the overall caesarean section rate.

**Conclusion:** Auditing the practice of IOL helps to identify potential areas where inappropriate inductions can be reduced. This will help to minimize unnecessary interventions for pregnant women.

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Eng Loy TAN,  
MBBS (Singapore),  
MRCOG (UK), M Med (O&G) (Singapore).  
dr\_tan\_el-sgh@yahoo.com

Devendra KANAGALINGAM,  
MBBS (Singapore), MRCOG (UK).  
dharkan@starhub.net.sg

Hak Koon TAN, MBBS (Singapore),  
MRCOG (UK), M Med (O&G) (Singapore), FAMS.  
gogthk@sgh.com.sg

Department of Obstetrics & Gynaecology,  
Singapore General Hospital,  
Outram Road, Singapore 169608.  
Tel: 6321 4667

## BACKGROUND

Induction of labour is one of the most common procedures in obstetric practice. It is an intervention primarily designed to artificially initiate uterine contractions with the eventual goal of achieving vaginal birth of a baby<sup>1</sup>. The indications for induction of labour are varied but can be classified as either for maternal or foetal reasons. (Table 1)

The rates of induction of labour vary from country to country depending on local practices. In the United States of America, induction rates exceeding 40% of all births may be found at many community hospitals<sup>1</sup>. In England and Wales, the induction rate

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varied between 16.8% and 20.6% overall from 1980-1995<sup>2</sup>. On average, about 20% of women undergo labour of induction in the United Kingdom<sup>1</sup>.

The process of induction of labour does not usually involve just a single intervention but rather, a complex set of sequential interventions. Mechanical methods for induction of labour are the earliest reported methods<sup>1</sup>, dating to the days of Hippocrates<sup>2</sup>. Contemporary mechanical induction of labour techniques involve the use of hygroscopic or osmotic dilators which may come from natural sources such as sterile seaweed (*Laminaria japonica* or *Laminaria digitata*) or which may be synthetic (such as Lamical (Medtronic xomed, Inc, Jacksonville, FL) or Dilapan (J.C.E.C. Company, Inc, Kendall Park, NJ). Pharmaceutical methods of induction of labour involving the use of prostaglandins and oxytocin have predominated over mechanical methods in recent decades with these agents being adopted as the main ones used for induction of labour in the UK<sup>1</sup>.

As with any medical intervention, induction of labour may have serious unwanted side-effects including failed induction leading to caesarean section, uterine hyperstimulation resulting in intrapartum fetal hypoxia, maternal discomfort and febrile morbidity, and increased rates of operative vaginal birth<sup>3</sup>.

Clinical audit has been recognised as an effective method for improving the quality of patient care<sup>4</sup>. Given the multitude of serious unwanted side-effects of induction of labour, it is timely that an audit be carried out on our practice of induction of labour so that shortcomings can be identified with the eventual aim of improving the quality of clinical care.

### AIM

We aimed to audit the practice of induction of labour in the Department of OB-GYN, Singapore General Hospital.

### METHODS

We carried out a retrospective review on all obstetric deliveries performed in the Department of OB-GYN, Singapore General Hospital from 1 January 2005 to 31 December 2006. All cases of induction of labour were identified through the department's labour ward computer database system. The indication for each labour induction, the method of induction, the gestational age at delivery, as well as the final outcome of each induction were retrieved from the computer database. These data were then exported to a computer spreadsheet programme (Microsoft Excel 2008) for further statistical analysis.

## RESULTS

A total of 3389 women underwent obstetric delivery in our department between 2005 and 2006. 14.9% (505) of these deliveries had labour induced (Table 2). Out of these 505 cases, 447 (88.5%) utilized vaginal prostaglandins (Prostin E2) for induction, while the remainder were induced by amniotomy (Figure 1).

The most common indication for IOL was for post-date pregnancies (38%), followed by oligohydramnios (22.8%) and maternal diabetes mellitus (pre-gestational and gestational diabetes mellitus combined) (9.3%). Hypertensive disorders of pregnancy accounted for 8.5% of all labour inductions. 7.5% of labour inductions were performed at the patient's request.

The mean gestational ages at delivery for the three most common indications detailed above were 40.7, 38.9 and 38.2 weeks respectively. The mean gestational age of delivery for all induced cases was 39.5 weeks. A breakdown of these results is detailed in Table 3.

66.9% of women who underwent induction of labour delivered spontaneously via the vaginal route. 23.2% were delivered by caesarean section. The remaining cases (9.9%) underwent operative vaginal delivery via either ventouse or forceps.

## DISCUSSION

Our overall induction rate of 14.9% from 2005 to 2006 compares favourably with the average rate of 20% in the United Kingdom<sup>1</sup>.

The largest number of inductions was carried out for post-date pregnancies, accounting for nearly two-fifths of all induced women. Knowing the actual gestational age at induction of labour for this group is important: it has been recommended that induction of labour be offered to women with uncomplicated pregnancies at 41 weeks gestation<sup>1</sup> since this reduces perinatal mortality without an increase in caesarean section rates<sup>1</sup>. Unfortunately, based on the data available from our labour ward database, we were unable to accurately calculate the actual gestational age at induction (rather than at delivery). We do know however, that women who undergo induction of labour in our department are generally induced for no more than 2-3 days on average till actual delivery. This fact then allows us to an extent, to use the average age at delivery of these "post-date" pregnancies as a surrogate for the actual gestation age at induction. With this in mind, the average gestational age at delivery of 40.7 weeks for women induced for post-date pregnancies raises the possibility that induction of labour may have been carried out too early.

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Looking into the actual gestational age at induction may identify more accurately the shortcomings we might have had in this area.

A significant proportion of women (22.8%) were induced for the indication of oligohydramnios with a mean gestational age at delivery of 38.9 weeks. The National Institute of Clinical Excellence (NICE) in the United Kingdom has recommended that amniotic fluid volume estimation be performed by means of measuring maximum amniotic pool depth only from 42 weeks gestation for low risk pregnancies. From our data analysis, we were unable to tell which proportion of women induced for oligohydramnios had low-risk pregnancies. However, the mean gestational age at delivery for this group of women suggests to us that a significant proportion of women had estimation of amniotic fluid volume done prior to 42 weeks of gestation. Examining our practice and timing of amniotic fluid volume assessment, as well as the diagnostic criteria used in such assessments, may help to reduce the number of inductions for oligohydramnios.

7.5% of induced mothers had their inductions performed by their own requests in the absence of a definite medical indication. The Ministry of Health in Singapore has suggested that the decision to perform induction of labour in such circumstances "should be taken on a case-by-case basis, after fully discussing the potential risks and disadvantages with the patient"<sup>1</sup>. The NICE guidelines make similar recommendations, suggesting that "where resources allow, maternal request for induction of labour should be considered when there are compelling

psychological or social reasons and the woman has a favourable cervix"<sup>1</sup>. Although we did not look into the reasons why this group of mothers requested for induction of labour in our audit, it would certainly be a potentially interesting area that we should look into in a subsequent re-audit.

The ultimate aim of labour induction is successful delivery of the baby via a vaginal route. With this in mind, we note that 66.9% of induced mothers delivered spontaneously via the vaginal route. Less than 10% required operative assistance for vaginal delivery while about one-fifth of induced mothers required caesarean section ultimately. These rates are comparable to the rates of spontaneous vaginal delivery, operative vaginal delivery and caesarean section delivery in our department. This would suggest then that induction of labour within our department has not contributed to an increase in caesarean section rate. Nevertheless, reducing the incidence of inappropriate induction of labour may help to reduce the overall caesarean section rate in the department.

### CONCLUSION

Our audit of the practice on induction of labour suggests that our department's practice is in line with current recommendations with the exception of certain areas warranting a further re-look. Presenting the results of this audit along with recommendations for improvement will be a very important part of completing the auditing cycle. We look forward to perform a repeat audit in due course. This repeat audit will provide us with useful information on our progress in achieving quality patient care.

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