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Does a policy of earlier induction affect labour outcomes in women induced for postmaturity? A retrospective analysis in a tertiary hospital in the North of England

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ABSTRACT

Objectives: to investigate whether a change in the management of postmature pregnancy to earlier induction affects the length of labour and the induction process. Secondly, to assess the feasibility of the research process to inform a future larger study.
Design: a change in management of postmature pregnancy in an NHS hospital in October 2013, from induction at 42 weeks gestation to induction between 41–42 weeks, provided an opportunity to conduct a retrospective analysis. Pre-existing data from the maternity database and casenotes were collected and primary outcomes analysed using the Mann-Whitney test and the Hodges-Lehman confidence interval for differences in medians.
Setting: a large city based tertiary referral hospital in the North of England.
Participants: 125 women induced before the change in policy were compared with 309 women induced after the change.
Measurements: primary outcomes were length of 1st and 2nd stage of labour, overall length of labour, length of induction to established labour and length of induction to birth.
Findings: the median overall length of labour for women induced at 42 weeks was 6.5 hours, while for women induced at 41–42 weeks this was 5.2 hours. The difference was not statistically significant (p=0.15, 95% CI for median difference −0.27 to 1.93 hours) with a small effect size (Pearson's r=−0.08). The median length of induction to birth was 13.6 hours for women induced at 42 weeks and 16.5 hours for women induced at 41–42 weeks. This difference was also not statistically significant (p=0.14, 95% CI for median difference −7.25 to 1.20 hours) with a small effect size (Pearson's r=−0.13).
Key conclusions and implications for practice: This study demonstrated no statistically significant differences in length of labour and induction following a change in the management of postmature pregnancy to earlier induction. A large study is needed to establish definitively the effects of earlier induction on labour outcomes.

Introduction

Postmature or prolonged pregnancy is defined as a pregnancy that continues beyond 42 weeks gestation (Doherty and Norwitz, 2008). It is estimated that up to 10% of pregnancies are prolonged, although this varies considerably between countries according to the accuracy of pregnancy dating and the use of induction of labour: for example, there are 0.4% in Austria but over 7% in Denmark (Zeitlin et al., 2007). These pregnancies are of concern because there is substantial observational evidence indicating increasing fetal, neonatal and maternal risks as pregnancy continues beyond 40 weeks gestation (Caughey et al., 2008). Perinatal mortality rates have been found to increase significantly from 0.018% at 41 weeks, sharply rising after 42 weeks to 0.51% at 43 weeks, (Heimstad et al., 2008). Furthermore, there is evidence of an increased risk of morbidity including meconium aspiration, low Apgar scores, postpartum haemorrhage and caesarean section (Olesen et al., 2003). In an attempt to minimise these risks and prevent postmature pregnancy, United Kingdom (UK) national and international guidance recommend induction of labour between 41 and 42 weeks gestation (NICE, 2008; WHO, 2011). Induction, rather than expectant management (continuing the pregnancy), has been shown to decrease perinatal mortality, but the exact gestation at which induction

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is appropriate is not clear (Gülmezoglu et al., 2012). This uncertainty has resulted in variation with some UK hospitals offering induction as soon as women reach 41 weeks, some during week 41 and others delaying until 42 weeks.

Despite the benefits that induction may bring in preventing postmaturity, the intervention itself is not without risk. The most common complication is failed induction leading to caesarean section which has been estimated to occur in 17% of inductions (Wolfe et al., 2011). There is also a 5% risk of excessive uterine activity, known as tachysystole, which can reduce placental blood flow resulting in fetal heart rate abnormalities and eventual fetal hypoxia if untreated (Thomas et al., 2014). Observational studies have suggested that induction compared with spontaneous labour is associated with increased risk of caesarean birth (Ehrentha et al., 2010), postpartum haemorrhage (Phillip et al., 2004), increased admission to newborn intensive care and increased use of analgesia/anaesthetics (Guerra et al., 2009). However, there are concerns that using spontaneous labour as a comparison group may be inappropriate as this is not a choice available for clinicians and may lead to exaggerated estimates by excluding planned caesarean sections (Danilack et al., 2016).

Many of the undesirable effects of induction might be considered the likely result of intervening when the cervix is not ready for labour (Gülmezoglu et al., 2012). Spontaneous labour occurs following a gradual process of physiological changes towards the end of pregnancy and it is, therefore, easier to induce labour when a woman is further along in this natural process (NICE, 2008). It might seem logical that the more advanced the gestation at which induction takes place, the less complicated the process might be and also more women will labour spontaneously and avoid induction altogether. It has been estimated that inductions increase by 15–20% when a policy of induction at 41 rather than 42 weeks is in place (Menticoglou and Hall, 2002). These concerns have led to some advocating for later induction at 42 weeks (Mandruzzato, 2010).

Stillbirth, not least in late pregnancy, is a devastating complication and it could be argued that offering women earlier induction, resulting in higher induction rates, is a small trade-off for preventing more of these deaths. Substantial evidence indicates that when induction is compared to expectant management, rather than spontaneous labour, there does not seem to be an increase in the risk of caesarean section, even when undertaken earlier than 41 weeks (Gulmezoglu et al., 2012; Stock et al., 2012; Walker et al., 2016). This reassuring evidence has led to calls for earlier induction, particularly in the current climate where there is a global priority to reduce perinatal mortality (Unicef & WHO, 2014). This is prudent in the UK where the government has set out an ambition to halve the stillbirth rate by 2030 (O'Connor, 2016). However, the exact gestation at which induction should be offered for the optimum balance of maternal and fetal risks still needs clarity. The WHO (2011) explicitly states that they regard the recommendation for induction after 41 weeks gestation as 'weak' and based on low quality evidence; hence further investigation is warranted.

Many women are healthy and regarded as low risk when their pregnancy continues beyond 40 weeks and they need to make an informed choice about how they wish to manage this. The absolute risk of stillbirth is low and estimates of the number of inductions needed to prevent one perinatal death are high at 416 (Gulmezoglu et al., 2012). Clearly the evidence regarding stillbirth and induction is crucial in this decision but given the rarity of stillbirth, women and the advising health professionals also need information about a range of other induction and labour outcomes which the current evidence base does little to provide. Two outcomes that have important clinical implications are the length of labour and the length of the induction process. Prolonged labour is associated with operative birth (Adams, 2012), postpartum haemorrhage (Sheiner et al., 2005) and increased use of analgesia (Lancaster et al., 2012). Furthermore, survey and qualitative evidence indicate that a longer labour and induction can result in lower satisfaction rates and negative accounts of birth (Shetty et al., 2005; Nystedt and Hildingsson, 2014; Murtagh and Folan, 2014). There is a dearth of evidence on how these outcomes are affected by the timing of induction and research is needed to inform appropriate counselling of women.

A change in policy in October 2013 at an NHS Trust from induction of labour at 42 weeks gestation to induction between 41 and 42 weeks, enabled a retrospective analysis of whether this change resulted in any differences in labour and induction characteristics. Additionally, this study was undertaken to inform how a much larger study could be conducted and to address the validity of methods for identifying induced women and their outcomes.

Methods

Design and participants

A retrospective analysis was undertaken at a large city hospital in the north of England which is part of an NHS Trust providing maternity care across two hospitals for approximately 10,000 births per annum. The main sample consisted of 434 women who were induced for postmaturity between January 2013 and June 2014. This was divided into those induced before implementation of the new induction policy (late group) and those after (early group):

- Late group – 125 women induced between 1st January 2013 and 30th September 2013 when management involved induction at 42 weeks (294 days).
- Early group – 309 women induced between 1st October 2013 and 30th June 2014 when management involved induction between 41 and 42 weeks (287–294 days).

The main sample size was dictated by the number of eligible women with available data in the study time period. Data were obtained from the hospital's maternity database (Matsys) which stores labour and birth details entered routinely after birth by midwives for administrative purposes. Data on the length of induction were entirely missing from the database and so case notes were accessed for this outcome but only completed for a sub-sample of 188 women from the main sample. The sub-sample consisted of 93 women in the late group and 95 women in the early group.

Exposure

The exposure in the study was induction of labour for postmaturity either before or after the change in policy to earlier induction. Eligibility criteria included women with a singleton pregnancy and a cephalic presentation who were induced for postmaturity. They were identified through the database and eligibility was assessed through the ward induction diary from 2013 and 2014, where midwives recorded the indication for each woman's induction. The diaries from one hospital were in poor condition and unusable; therefore eligible participants were all obtained from the same hospital. Women who were induced for other reasons were excluded and therefore the majority of included women were considered low risk. Nevertheless, a minority did have complications or risk factors which did not necessitate earlier induction or birth. These included mild hypertension, previous caesarean birth, parity more than 4, age outside the range of 18–39 and Body Mass Index (BMI) more than 35 kg/m^2. Women were not excluded on this basis to ensure the sample was as representative as possible of the target population of women induced for postmaturity. Women who were augmented (labour accelerated) rather than induced were excluded as they were not relevant to the study aims.

Pregnancies were dated using ultrasound to ensure accurate gestational age and women were offered a membrane sweep at 40 weeks