



Clinical Practice Guideline

On Induction of Labour and Antenatal Surveillance of the post-dates pregnancy

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2012

Published by
Department of Obstetrics & Gynaecology
University of Malta Medical School, Malta

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INTRODUCTION

Thomas Denman in 1756, at a meeting in London, suggested that induction of labour may be a useful treatment for cephalo-pelvic disproportion which was at the time, a common cause of maternal and foetal mortality. By 1788 induction of labour was met by general approval by the British Obstetric establishment. Thirty years later Rigby the Younger hailed induction of labour "*as perhaps the greatest improvement in operative midwifery since the invention and gradual improvement of the forceps*". (Hibbard 2000). Note must be taken of the discretion this latter statement portrays, a reflection of erudite Obstetric caution.

Obstetric caution is also required in modern day Induction of Labour whereby the rates of this obstetric intervention have increased substantially over the past twenty years. In the U.S. induction of labour, increased from 9.5 percent in 1990 to 22.1 percent in 2004. Similarly in 2004 and 2005, one in every five deliveries in the UK was induced (NICE CG70).

The reasons of the increased rates of induction of labour vary from medical to social. The most common medical reason for induction of labour is post-dates pregnancy. Other medical reasons involve maternal conditions such as hypertension and foetal reasons including intrauterine growth retardation. The unpinning rationale in this form of management involves the suggestion that the intrauterine environment appears less favourable for either or both mother and baby.

Induction of labour is not without its complications. As opposed to the British attitude, the Academy of Paris in 1827 ruled that induction of labour "*was unjustifiable under any circumstances*". In Germany, induction of labour was only introduced in the mid-nineteenth century. This stance may have resulted from a number complications that developed following induction of labour (Hibbard 2000).

In the U.K. induction of labour current methods led to less than two thirds of women giving birth without further intervention. Some 15% of induced mothers required instrumental deliveries while in 22% of induced labours, emergency caesarean section had to be resorted to. Increased analgesia is required in induced labours (NICE CG70). Uterine hyperstimulation can develop following prostaglandin and syntocinon induction of labour. As a corollary intrapartum foetal distress can ensue.

There is also a management issue with induction of labour. Induction of labour can place more strain on labour wards than spontaneous labour. Traditionally, induction is carried out during the daytime when labour wards are often already busy with other elective procedures such as planned caesarean sections.

INDUCTION OF LABOUR FOR POST-DATES PREGNANCIES

Beyond term there is increased risk of intrauterine foetal death and perinatal death. The risks of prolonged gestation on pregnancy are better reflected by calculating foetal and infant losses per 1000 ongoing pregnancies. With the rare occurrence of post-dates stillbirth, large studies are required to discern the association between prolonged gestation and foetal loss.

Two large studies have assessed the stillbirth rates across the later weeks of pregnancy. Hilder et al (1998) in the U.K. undertook an observational retrospective analysis (Evidence Level: 3) of 171 527 births. Table I shows the stillbirth rate per 1000 births spanning from 37 weeks to 43 weeks gestation.

Gestational Age	Stillbirth/1000 ongoing pregnancies
37 weeks GA	0.35 (95% CI 0.26 to 0.44)
38 weeks GA	0.56 (95% CI 0.44 to 0.68)
39 weeks GA	0.57 (95% CI 0.44 to 0.70)
40 weeks GA	0.86 (95% CI 0.68 to 1.05)
41 weeks GA	1.17(95% CI 0.92 to 1.62)
42 weeks GA	1.55 (95% CI 0.79 to 2.31)
≥ 43 weeks GA	2.12 (95% CI 0.55 to 5.43)

Table I. Stillbirth Rate and Gestational Age.

Study Type: Observational retrospective analysis. Evidence Level: 3 ;171 527 births. Hilder et al (1998) UK

From the table above it may be appreciated that substantial rises in stillbirths occur beyond 41 weeks gestation. However despite the large numbers of births the confidence intervals in none of the cohorts crosses unity. When calculated per 1000 ongoing pregnancies, the rate of stillbirth increased from 0.35 per 1000 ongoing pregnancies at 37 weeks to 2.12 per 1000 ongoing pregnancies at 43 weeks of gestation. Moreover in this study neonatal and post-neonatal mortality rates fell significantly with advancing gestation, from 151.4 and 31.7 per 1000 live births at 28 weeks, to reach a nadir at 41 weeks of gestation (0.7 and 1.3 per 1000 live births, respectively), increasing thereafter in prolonged gestation to 1.6 and 2.1 per 1000 live births at 43 weeks of gestation.

Another more recent study by Heimstad et al (2006) from Norway, confirmed the pattern seen in the Hilder et al study. In this study of over 27,000 births, the stillbirth rates rose throughout the latter weeks of pregnancy, however the greatest increase was noted at the 42 weeks gestation (Table II). The number of inductions to avoid a perinatal death was 527 at day 287 (41 weeks), and 195 at day 302 (43 weeks) (p -value < 0.02). It was estimated that on a national basis, routine induction of labour at 41 weeks required an increase of 14,000 inductions per year. It was concluded that the induction rate before 41 weeks to avoid one foetal or neonatal death is high (671-195), but decreases constantly with gestational age beyond 41 weeks.

Although the stillbirth rates of both studies show similar patterns, there appears a divergence from 41 weeks onwards. This may reflect the background population and the health care systems providing the antenatal surveillance.

Gestational age at Birth	Stillbirth Rates
37 weeks	0.35 stillbirths /1000
38 weeks	0.25 stillbirths /1000
39 weeks	0.43 stillbirths /1000
40 weeks	0.51 stillbirths /1000
41 weeks	0.74 stillbirths /1000
42 weeks	1.55 stillbirths /1000

Table II. Intrauterine Death Heimstad et al (2006)

Country: Norway Prospective study. Evidence level = 3 Pregnancies n = 27 514, Stillbirth /1000

Randomized controlled trials suggest that elective induction of labour at 41 weeks of gestation and beyond may be associated with a *decrease* in both the risk of Caesarean section rates and meconium-stained amniotic fluid. However the evidence regarding elective induction of labour *prior* to 41 weeks of gestation is insufficient to draw any conclusion.

Wennerholm et al (2009) have carried out a meta-analysis of randomised controlled trials on elective induction of labour at 41 completed weeks of gestation. Thirteen trials fulfilled the inclusion criteria for the meta-analysis. Elective induction of labour was not associated with lower risk of perinatal mortality compared to expectant management (relative risks (RR): 0.33; 95% confidence intervals (CI): 0.10-1.09). Elective induction was however associated with a significantly lower rate of meconium aspiration syndrome (RR: 0.43; 95% CI: 0.23-0.79). More women randomized to expectant management were delivered by caesarean section (RR: 0.87; 95% CI: 0.80-0.96). The meta-analysis illustrated a problem

with rare outcomes such as perinatal mortality. No individual study with adequate sample size has been published, nor would a meta-analysis based on the current literature be sufficient.

A Cochrane Database Review (2006) has also assessed trials on induction of labour in 19 trials reporting on 7984 pregnancies. Gülmezoglu et al have shown that a policy of labour induction at 41 completed weeks or beyond was associated with fewer (all-cause) perinatal deaths (1/2986 versus 9/2953; relative risk (RR) 0.30; 95% (CI) 0.09 to 0.99). If deaths due to congenital abnormality were excluded, there would be no deaths in the induction group and 7 deaths in the no-induction expectant group. No evidence of a statistically significant difference in the risk of caesarean section (RR 0.92; 95% CI 0.76 to 1.12; RR 0.97; 95% CI 0.72 to 1.31) for women induced at 41 and 42 completed weeks respectively.

The Cochrane Database Review (2006) showed that there were fewer babies with meconium aspiration syndrome (41+: RR 0.29; 95% CI 0.12 to 0.68, four trials, 1325 women 42+: RR 0.66; 95% CI 0.24 to 1.81, two trials, 388 women). An induction policy of 41 completed weeks or later compared to awaiting spontaneous labour either indefinitely or at least one week is associated with fewer perinatal deaths. However, the absolute risk is extremely small and women should be appropriately counselled on both the relative and absolute risks.

PREDICTING ANTEPARTUM STILLBIRTH

A key issue in allowing a pregnancy to continue up to 41 weeks gestation is putting the Obstetrician's mind at rest that antepartum surveillance can prevent stillbirth. Rates of stillbirth in the developed world, despite improvements in antenatal surveillance, have been static or rising in recent years.

Clinical prediction of stillbirth risk may allow more rigorous antenatal surveillance. The most prevalent independent risk factors are nulliparity, advanced age and obesity. These risk factors have become increasingly prevalent in the developed world(Smith 2006).

Obesity is particularly associated with stillbirth at term and after term. In connection with obesity, pregestational diabetes is a major risk factor for stillbirth and these women are usually offered intensive surveillance during pregnancy (Smith 2006).

Morbidly obese women are at particularly high risk. In a prospective population-based cohort study by Cedergren et al (2004), 3,480 women with morbid obesity, defined as a body mass index (BMI) more than 40, and 12,698 women with a BMI between 35.1 and 40 were compared with normal-weight women (BMI 19.8-26).

The perinatal outcome of singletons born to women without insulin-dependent diabetes mellitus was assessed after adjusting for variables. In the group of morbidly obese mothers (BMI greater than 40) when compared with the normal-weight mothers, there was an increased risk of the following outcomes (Cedergren et al 2004):

- preeclampsia (4.82; C.I. 4.04 - 5.74)
- antepartum stillbirth (2.79; C.I. 1.94 - 4.02)
- caesarean delivery (2.69 C.I. 2.49 - 2.90)
- instrumental delivery (1.34 C.I. 1.16 - 1.56)
- shoulder dystocia (3.14 C.I. 1.86 - 5.31)
- meconium aspiration (2.85 C.I. 1.60 - 5.07)
- foetal distress (2.52 C.I. 2.12 - 2.99)
- early neonatal death (3.41 C.I. 2.07 - 5.63)
- large-for-gestational age (3.82 C.I. 3.50 - 4.16)

For women with BMIs between 35.1 and 40, the associations were similar but to a lesser degree. In conclusion maternal morbid obesity in early pregnancy is strongly associated with a number of pregnancy complications and perinatal conditions (Cedergren et al 2004).

Similar to the above studies, obesity and nulliparity (first-time mothers) as independent risk factors for foetal death which also increased in the Maltese population are. Twenty percent of women have a body mass index of over 30 Kg/m² (obese) and the percentage would be close to double if all overweight women were included (Savona Ventura et al 2004). In connection with obesity and overweight women, diabetes in pregnancy is on the rise. In the U.K., a fourfold increase in foetal death has been noted in relation to gestational diabetes. Obesity also correlates with an increased risk for foetal malformation (Smith G 2006).

MATERNAL AGE AND STILLBIRTH

Over the past three decades, economic and social alterations in the developed world have significantly increased the number of women who delay childbirth to their late 30s and beyond. In the Maltese Islands, the average maternal age has increased significantly, whereby first-time mothers are older than before. The commonest group of women getting pregnant 30 years ago was between the ages of 19-24. This has shifted significantly to the 26-30 age range. In 2010 the most frequent age of delivery was 31 years while the average age of delivery is around 29 years (National Obstetrics Information Unit 2010). More children are being born to women at the extremes of the reproductive life.

Over just over a decade, between 1980 and 1993 in the European Union, the mean maternal age at first birth rose by 1.5 years, from 27.1 to 28.6 years. For the older women cohort in the U.S., between 1991 and 2001, the percentage of first births for women 35–39 years of age increased by 36% and that for women 40–44 years of age increased by 70%. This significant demographic shift has become an important public health issue, since numerous studies have indicated that increased maternal age (35 years of age or older) is associated with an increased risk of stillbirth.

A literature review by Huang et al (2008) collated a total of 913 studies of which 31 retrospective cohort and 6 case–control studies met the study’s inclusion criteria. In 24 (77%) of the 31 cohort studies and all 6 of the case–control studies, a higher maternal age was significantly associated with an increased risk of stillbirth. Across the studies assessed, the relative risks varied from 1.20 to 4.53 for older versus younger women (Table III.).

Table IIIa. Crude risk of stillbirth among older and younger women
31 retrospective cohort studies (after Huang et al CMAJ 2008)

Retrospective cohort studies	Older women (n/N)*	Younger women (n/N)*	OR or RR (95% CI)
<i>Population-based</i>			
Astolfi et al ¹⁴	1 174/202 054	8 455/2 089 070	1.44 (1.35-1.53)
Astolfi et al ¹⁵	3 228/512 381	7 932/1 983 000	1.57 (1.51-1.64)
Canterino et al ¹⁷	8 177/2 470 005	15 061/5 440 685	1.20 (1.16-1.23)
Cnattingius et al ¹¹	41/7 880	251/70 557	1.46 (1.05-2.03)
Conde-Agudelo et al ¹⁸	2 675/87 063	9 400/579 389	1.89 (1.82-1.98)
Donoso et al ¹⁹	65/7 066	742/175 256	2.18 (1.69-2.82)
Feldman ²⁰	441/46 596	2 013/323 455	1.53 (1.38-1.69)
Glinianaia et al ²⁴	365/53 448	973/228 694	1.61 (1.42-1.81)
Haglund et al ²⁵	95/21 467	558/163 689	1.30 (1.04-1.61)
Jacobsson et al ²⁷	217/32 867	2 785/876 361	2.08 (1.81-2.38)
Lammer et al ³⁰	59/5 086	435/63 044	1.69 (1.29-2.22)
Nybo Anderson et al ³²	261/48 950	3 238/763 411	1.26 (1.11-1.43)
Rasmussen et al ³⁴	457/163 782	130/83 820	1.80 (1.48-2.19)
Raymond et al ³⁵	349/75 062	1 811/563 180	1.45 (1.29-1.62)
Tough et al ³⁹	270/29 233	1 643/254 723	1.44 (1.26-1.63)
<i>Hospital-based</i>			
Bianco et al ¹⁴	2/1 404	29/6 978	0.34 (0.08-1.43)
Feresu et al ²¹	102/1 177	700/12 333	1.53 (1.25-1.86)
Fretts et al ¹⁰	127/11 942	561/82 376	1.57 (1.29-1.90)
Fretts et al ¹²	133/13 222	582/88 390	1.53 (1.27-1.85)
Gadow et al ²³	3 000/91 416	12 937/756 803	1.92 (1.85-2.00)
Heimann et al ²⁶	7/560	11/615	0.70 (0.27-1.81)
Jolly et al ⁷	312/48 658	1 581/336 462	1.37 (1.21-1.54)
Khandait et al ¹⁸	160/2 700	920/41 913	2.81 (2.36-3.34)
Kristensen et al ²⁹	20/3 163	92/21 342	1.47 (0.91-2.38)
Naeye ³¹	110/3 346	605/41 040	2.23 (1.83-2.72)
Pugliese et al ¹³	1/314	60/6 683	0.35 (0.05-2.55)
Roman et al ²⁸	10/382	56/7 786	3.64 (1.87-7.08)
Seoud et al ²⁷	17/319	4/326	4.53 (1.45-18.68)
Sheiner et al ³⁰	10/10 114	41/61 463	1.48 (0.74-2.96)
Viegas et al ⁴⁰	10/2 410	101/19 032	0.78 (0.41-1.50)
Ziadeh ⁴¹	3/143	1/148	3.15 (0.25-166.47)

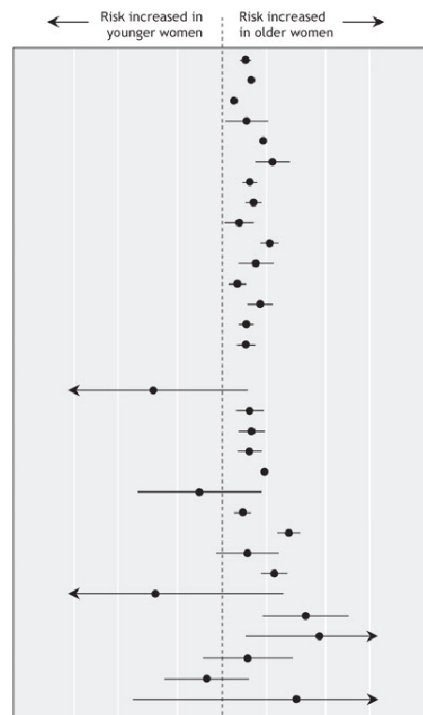
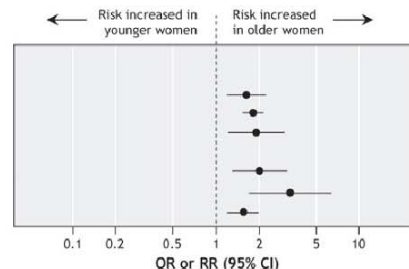


Table IIIb. Crude risk of stillbirth among older and younger women
6 case-control studies (after Huang et al CMAJ 2008)

Case-control studies	Older women (n/N)*	Younger women (n/N)*	OR or RR (95% CI)
<i>Population-based</i>			
Little et al ⁴³	81/201	1 023/3 468	1.61 (1.19-2.18)
Petridou et al ⁴⁵	249/2 675	560/10 386	1.80 (1.54-2.11)
Stephansson et al ⁴⁷	67/104	635/1 300	1.90 (1.23-2.94)
<i>Hospital-based</i>			
Ferraz et al ⁴²	31/212	203/2 577	2.00 (1.30-3.06)
Meda et al ⁴⁴	20/50	76/448	3.26 (1.68-6.31)
Smeeton et al ⁴⁶	204/888	132/816	1.55 (1.20-1.99)

*For each group, n = number of women experiencing stillbirth (number of cases in case-control studies), and N = total number of women in the sample (number of cases plus controls in case-control studies).



The biological mechanism of the increase in stillbirth risk with advanced maternal age remain unknown. The direct effect of maternal aging may be related to inadequate uteroplacental perfusion caused by diminished uterine vasculature in older women. The increased risk for antenatal stillbirth could also be attributed to the association between older age and certain risk factors, such as chronic diseases and medical or obstetric complications. Older women are more likely to have higher BMI's, experiencing pregnancy-induced hypertension or gestational diabetes. Some of these medical conditions may at the time of pregnancy be silent and remain undiagnosed. It is estimated that between 50% and 70% of mothers of stillborn infants had medical or pregnancy complications during their pregnancies.

ANTENATAL SURVEILLANCE IN THE POST-DATES PERIOD

As early as 1986, Boehm et al showed that cardiotocography was a commonly used for foetal well-being assessment. Cardiotocography was performed on a once weekly basis. The rate of stillbirths with reactive cardiotocography performed once a week, was 6.1 per 1000 in the author's previously published report. Cardiotocography was performed on a twice weekly basis beginning January 1981, and results were reported on 913 patients. The rate of stillbirths with reactive nonstress tests was reduced to 1.9 per 1000 in this second group. It was suggested that the patients who are at risk for adverse foetal outcomes should be evaluated on a twice weekly basis when the nonstress test was used as the primary test (Boehm et al 1986).

Bochner et al (1987) combined cardiotocography with ultrasound assessment of amniotic fluid volume for the antenatal evaluation of the post-term fetus. Post-term patients (884) were managed with amniotic fluid assessments and nonstress tests twice a week. There were no perinatal deaths or major neonatal morbidity. However, the antenatal testing sensitivity, specificity, negative, or positive predictive values were not improved by combining the two tests.

Individually, amniotic fluid assessment was just as accurate a predictor of foetal well-being and was a significantly more sensitive test than cardiotocography. Although the results also suggest that amniotic fluid assessment is superior to cardiotocography, they do not conclusively support the use of amniotic fluid assessment as the sole parameter for postterm antenatal surveillance.

A critical appraisal by Frank Manning of antenatal surveillance was carried out in 2009. Antepartum foetal testing is essential in making crucial decisions including inducing labour. Manning described "*the art and science of foetal assessment*" as fluid.

Combined testing of a range of foetal biophysical variables was described as an excellent predictor of foetal acidemia and risk of death or damage. Controversy persists regarding the optimal means of measuring amniotic fluid volume, some authors supporting the amniotic fluid index method while others favour the maximal vertical pocket method.

It is becoming increasingly more evident that a spectrum of foetal testing modalities based on clinical interpretation of different aspects of foetal adaptive responses to adversity is preferable in foetal surveillance. Furthermore, it is evident that in some foetal conditions, such as intrauterine growth restriction, foetal condition may change acutely and accordingly best outcome is achieved by much more frequent assessments.

Caughley et al (2010) noted that despite a lack of evidence, antepartum foetal surveillance of post-term pregnancies has become an accepted standard of care. However there exists a lack of consensus as to a specific regimen of surveillance in the post-partum period.

The American College of Obstetricians and Gynaecologists states that it is reasonable to begin antepartum testing after 41 weeks' gestation. As described previously, in one study of this issue, Bochner et al demonstrated that initiating monitoring at 41 weeks of gestation led to lower rates of complications.

No single method of antenatal surveillance has been shown to be superior to any other. Options include a nonstress test, contraction stress test, full biophysical profile, modified biophysical profile (nonstress test and amniotic fluid index), or a combination of these modalities. Evaluation of the amniotic fluid level has been shown to be especially important because of demonstrated increased adverse pregnancy outcomes.

Doppler ultrasonography has not been shown to provide any advantage for evaluating postdate or postterm pregnancies and should not be routinely used. A modified biophysical profile has been shown to be as sensitive as a full biophysical profile. Boehm et al demonstrated that twice-weekly testing of patients at risk for foetal distress was superior to weekly testing, decreasing the rate of stillbirth from 6.1 per 1000 live births to 1.9 per 1000.

Caughley et al conclude that the use of a nonstress test and an amniotic fluid index twice a week for pregnancies continuing past 41 weeks is reasonable. In addition, if any indication during antenatal surveillance leads the practitioner to question the intrauterine environment, delivery should be expedited.

In view of the above evidence the NICE Guideline CG70 declared that "Women with uncomplicated pregnancies should usually be offered induction of labour between 41+0 and 42+0 weeks to avoid the risks of prolonged pregnancy".

CEREBRAL PALSY AMONG TERM AND POST-TERM BIRTHS

Besides stillbirth and neonatal death, the issue of cerebral palsy has also been assessed in relation to gestational age. There is little information on the relation of cerebral palsy risk to gestational age in the term range, where most cerebral palsy occurs. Moster et al (2010) performed a study to determine whether timing of birth at term and post-term period is associated with risk of cerebral palsy.

A population-based follow-up study utilised the Medical Birth Registry of Norway to identify 1,682,441 singleton children born in the years 1967-2001 between the gestational ages of 37 through to 44 weeks. Congenital anomalies were excluded. The cohort was followed up through 2005 by liaison with other national registries. Of the cohort of term and post-term births, 1938 children were diagnosed with cerebral palsy in the Norwegian National Insurance Scheme.

Gestation at Birth	Absolute Risk	Relative Risk
37 weeks	1.91/1000 (95% CI, 1.58-2.25)	1.9 (95% CI, 1.6-2.4)
38 weeks	1.25/1000 (95% CI, 1.07-1.42)	1.3 (95% CI, 1.1-1.6)
40 weeks	0.99/1000 (95% CI, 0.90-1.08)	
42 weeks	1.36/1000 (95% CI, 1.19-1.53)	1.4 (95% CI, 1.2-1.6)
42+weeks	1.44/1000 (95% CI, 1.15-1.72)	1.4 (95% CI, 1.1-1.8)

Table IV. Prevalence & Absolute and Relative Risk for Cerebral Palsy by gestational age

The association of cerebral palsy and gestational age at birth were even stronger in a subset with gestational age based on ultrasound measurements. At 37 weeks the absolute risk was 1.17/1000 (95% CI, 0.30-2.04) and the relative risk was 3.7 (95% CI, 1.5-9.1). At 42 weeks the cerebral palsy rates were 0.85/1000 (95% CI, 0.33-1.38) and the relative risk was 2.4 (95% CI, 1.1-5.3). Adjustment for infant sex, maternal age, and various socioeconomic measures had little effect. Compared with delivery at 40+ weeks' gestation, delivery at 37 or 38 weeks or at 42 weeks or later was associated with an increased risk of cerebral palsy.

SWEEPING OF FOETAL MEMBRANES

Membrane sweeps has been reported since the 19th century and is believed to initiate the onset of labour. The procedure involves that during a vaginal examination, the foetal membranes are separated from the cervix and lower uterine segment. The sweeping finger is gently rotated through 360° if possible.¹⁷ If the cervix is closed, gentle stretching of the cervix or cervical massage may be attempted. These procedures release endogenous prostaglandins, soften the cervix and encourage oxytocin-induced uterine contractions. After membrane sweep the plasma concentration of prostaglandin rises to 10% the level achieved in labour.¹⁷

Review of clinical trials, showed no increased incidence of foetal infection or neonatal morbidity related to the procedure. Maternal morbidity is related mainly to significant discomfort or pain during procedure, bleeding, and contractions not leading to labour within 24 hours.^{18,19}

Membrane stripping has been an effective outpatient method to reduce the number of patients with pregnancies exceeding 41+0.^{20,21} This procedure is generally most efficacious in nulliparous women with unfavourable Bishop scores. In a study by Berghella et al. patients were randomized to weekly sweeping of membranes or gentle exams starting at 38 weeks.²⁰ Time to delivery was significantly decreased with membrane stripping, and there were fewer pregnancies reaching past 41+0 weeks. Multiple episodes of membrane sweeping may be more efficacious.

A recent Cochrane review assessed 22 trials involving sweeping of the membranes. Membrane sweep at term (38–41 weeks) reduced the frequency of pregnancies continuing after 41+0 weeks (RR 0.59; 95% CI 0.46–0.74) and after 42+0 weeks (RR 0.28; 95% CI 0.15–0.50). Eight women would need to undergo sweeping of membranes to prevent one induction of labour.²¹

CONCLUSIONS

The management of post-dates pregnancies frequently presents a dilemma between an expectant management with further antenatal surveillance or resorting to induction of labour. It appears from the most recent evidence, that inducing labour at 41 weeks (max 41+3) in accurately dated low risk pregnancy is currently the best strategy of managing the Post-dates gestation. Prior to induction of labour between 40 and 41+3 antenatal testing with cardiotocography and amniotic fluid assessment may strengthen the safety net of antenatal surveillance. The combination of post-dates antenatal foetal surveillance and induction of labour between 41-41+3 does not increase the Caesarean delivery rate on the contrary, it may decrease the Caesarean delivery rate.

Practice Points

- Induction of labour has a significant impact on the health of the mother and child.
- Induction of labour is associated with an increased intervention rate.
- Evidenced based recommendations for induction of labour for Post-dates Low Risk cases is 41+3 gestation - Commonly used gestational end-point in UK units.
- The maximum gestation permitted at 41+3, allows for the CRL dating SEM of +/- 3-4 days
- Increased antenatal surveillance 40 - 41+3 with cardiotocography (CTG's) and Amniotic Fluid (either Deepest Vertical Pool [DVP] or Amniotic Fluid Index [AFI])
- Women should be offered the option of membrane sweeping commencing at 38 to 41 weeks

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WHO RECOMMENDATIONS ON INDUCTION OF LABOUR

- # General principles related to the practice of induction of labour
- # Induction of labour should be performed only when there is a clear medical indication for it and the expected benefits outweigh its potential harms.
- # In applying the recommendations, consideration must be given to the actual condition, wishes and preferences of each woman, with emphasis being placed on cervical status, the specific method of induction of labour and associated conditions such as parity and rupture of membranes.
- # Induction of labour should be performed with caution since the procedure carries the risk of uterine hyperstimulation and rupture, and foetal distress.
- # Whenever induction of labour is carried out, facilities should be available for assessing maternal and foetal well-being.
- # Women receiving oxytocin, misoprostol or other prostaglandins should never be left unattended.
- # Failed induction of labour does not necessarily indicate caesarean section.
- # Whenever possible, induction of labour should be carried out in facilities where caesarean section can be performed.

Specific recommendations and their strength and quality of available evidence

Context	Recommendation	Quality of evidence	Strength
When induction of labour may be appropriate	1. Induction of labour is recommended for women who are known with certainty to have reached 41 weeks (>40 weeks + 7 days) of gestation.	Low	Weak
	2. Induction of labour is not recommended in women with an uncomplicated pregnancy at gestational age less than 41 weeks.	Low	Weak
	3. If gestational diabetes is the only abnormality, induction of labour before 41 weeks of gestation is not recommended.	Very low	Weak
	4. Induction of labour at term is not recommended for suspected fetal macrosomia.	Low	Weak
	5. Induction of labour is recommended for women with prelabour rupture of membranes at term.	High	Strong
	6. For induction of labour in women with an uncomplicated twin pregnancy at or near term, no recommendation was made as there was insufficient evidence to issue a recommendation.	–	–

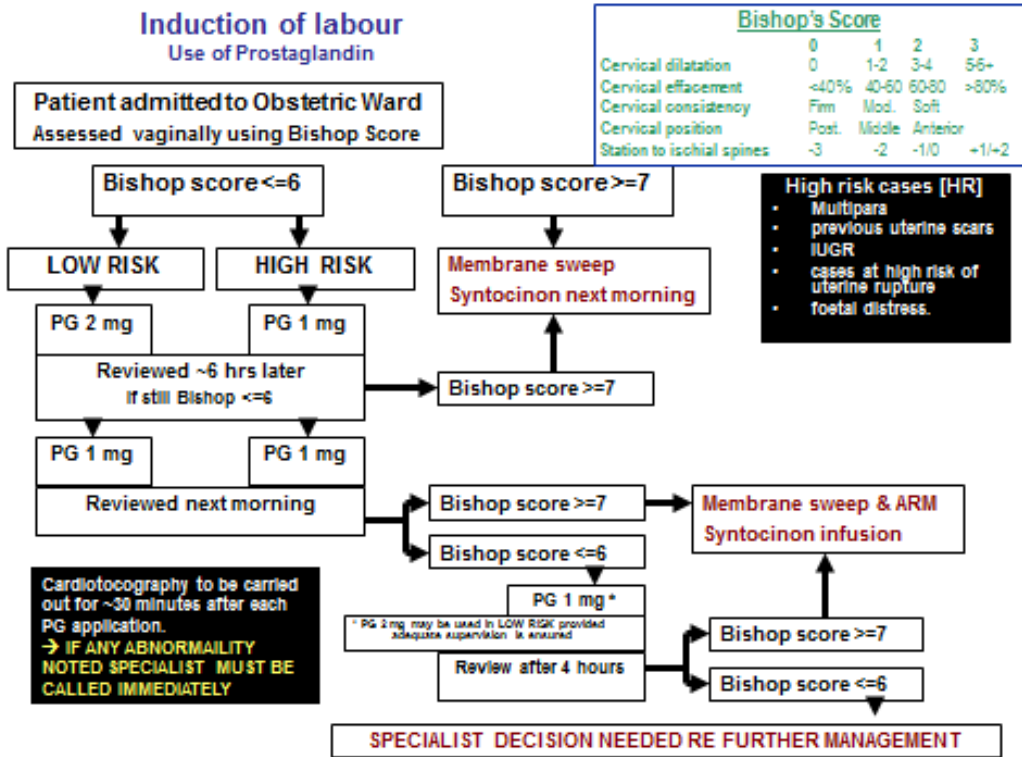
Methods of induction of labour	7. If prostaglandins are not available, intravenous oxytocin alone should be used for induction of labour. Amniotomy alone is not recommended for induction of labour.	Moderate	Weak
	8. Oral misoprostol (25 µg, 2-hourly) is recommended for induction of labour.	Moderate	Strong
	9. Low-dose vaginal misoprostol (25 µg, 6-hourly) is recommended for induction of labour.	Moderate	Strong
	10. Misoprostol is not recommended for induction of labour in women with previous caesarean section.	Low	Strong
	11. Low doses of vaginal prostaglandins are recommended for induction of labour.	Moderate	Strong
	12. Balloon catheter is recommended for induction of labour.	Moderate	Strong
	13. The combination of balloon catheter plus oxytocin is recommended as an alternative method of induction of labour when prostaglandins (including misoprostol) are not available or are contraindicated.	Low	Weak
	14. In the third trimester, in women with a dead or an anomalous fetus, oral or vaginal misoprostol are recommended for induction of labour.	Low	Strong
	15. Sweeping membranes is recommended for reducing formal induction of labour.	Moderate	Strong

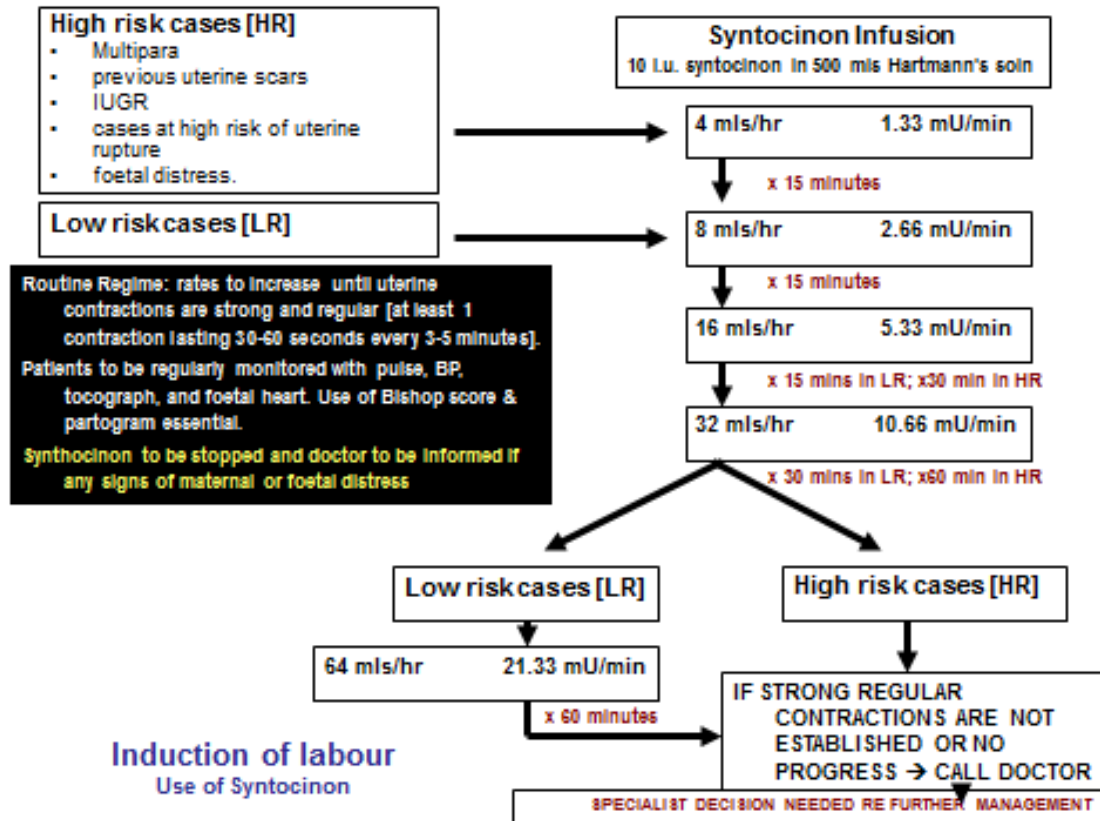
Management of adverse events related to induction labour	16. Betamimetics are recommended for women with uterine hyperstimulation during induction of labour.	Low	Weak
Setting for induction of labour	17. Outpatient induction of labour is not recommended for improving birth outcomes.	Low	Weak

Reference:

WHO recommendation for induction of labour. WHO, 2011

MANAGEMENT FLOW CHART





Specialist regime for induction

Specialist Regime: to be introduced only after consultation with the Specialist-on-call, when there is no progress in cervical dilatation after four hours of induction and no signs of foetal distress.

Consultation with the Specialist-on-call should take place at ~2 hours after start of induction for both Low and High Risk Patients, the former being on a syntocinon infusion rate of 64 mls/hr, while High Risk Cases on a rate of 32 mls/hr.

Close monitoring of foetal heart rate and maternal parameters is essential in these cases.

