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Obstetrics & Gynecology International Journal

Research Article

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Intrauterine fetal death management: A retrospective comparative study of induction of labour and spontaneous onset of labour

Abstract

Objectives: To examine the outcome of women who have had an intrauterine fetal death with regards to induction of labour versus expectant management by waiting for spontaneous onset of labour.

Methods: Examination of the database containing stillbirth data between the years 2000 – 2019. This returned 820 cases. Exclusion criteria included those stillborn babies as part of a multiple birth, intrapartum stillbirths and those delivered by elective caesarean section. After exclusions we retained 488 cases, 125 who went into spontaneous labour and 386 who underwent induction of labour.

Results: Achieving a successful cephalic vaginal delivery is equally as likely with both induction of labour and awaiting spontaneous onset of labour ($p = 0.25$, NS). The risk of pyrexia comparing the two groups is non significant ($p = 0.37$). Neither spontaneous onset of labour or induction of labour has a significant impact on median duration for each stage of labour ($p = 0.90$, NS). There is a significantly greater incidence of hypertensive disease in the induction of labour group (15.4% vs 5.6%, $p < 0.01$)

Conclusion: This study indicates that both spontaneous onset of labour and induction of labour are equally effective strategies for management of an intrauterine fetal death for otherwise healthy women.

Keywords: intrauterine fetal death, induction of labour, spontaneous onset of labour, expectant management

Volume 17 Issue 2 - 2026

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Received: April 14, 2026 | **Published:** April 27, 2026

Abbreviations: IUD, intrauterine fetal death; DIC, intravascular coagulation; IOL, induction of labour; SOL, spontaneous labour; VBAC, vaginal birth after caesarean

Introduction

An intrauterine fetal death (IUD) is a devastating occurrence that has both immediate and long term impacts on the patient, partner and wider family as well as the clinician. IUDs occurs in approximately 1:200 of pregnancies, estimated at 2.6 million worldwide at or above 28 weeks gestation.[1,2]

An IUD is defined as a fetus that demonstrates no signs of life in-utero i.e. absent fetal heartbeat. The consequences of the diagnosis is difficult for a clinician to bear with nearly 1 in 10 obstetricians reporting that they had considered giving up obstetric practice due to the emotional toll in caring for a woman with a stillbirth.[2]

The causes of an IUD are multiple however the commonest identified causes include hypertensive disorders, intrauterine growth restriction, infection and diabetes. The most common scenario is where the aetiology is "unexplained" accounting for 33-50% of cases.[3] There are many sequalae associated with an IUD. The physical and immediate effects can range from hypertension (headache, abdominal pain, visual changes, oedema), infection (SIRS/sepsis), bleeding and disseminated intravascular coagulation (DIC). It is the psychological impacts that can have deep and lasting consequences on a woman and their partners. Immediately patients experience grief, anxiety, depression and long term studies have shown that those women who have suffered one or more pregnancy losses are 35% more likely to require psychiatric treatment than those that have had a live birth.[4] In an already stretched health service the added strain of more service users can have knock on effects and it is vital that care and compassion is not forgotten in the process to help these patients in what is a devastating time.

There is no universal standard approach to managing IUDs however many clinicians and patients appear to favour induction of labour (IOL) after the diagnosis has been made. Prior to the advent of medications such as misoprostal and syntocinon the usual management was expectant using the watchful waiting approach. Studies have shown that with this method spontaneous onset of labour (SOL) occurs within 2 weeks post IUD in 80-90% of cases.[5]

Currently the method of delivery is governed by patient preferences as there is no definitive data on labour outcome and maternal complications comparing IOL and SOL to guide the decision. This comparative study was undertaken to compare the outcome of IOL and SOL in cases of IUD.

Method

The Coombe Hospital keeps a contemporaneous data base of initial histories taken at booking and delivery data.

The database was examined for all stillbirths between the years 2000 and 2019 and 820 cases were retrieved. Stillborn babies that were part of a multiple pregnancy, those delivered by elective Caesarean section and those that were intrapartum stillbirths were excluded. After exclusions there were 488 stillborn babies that were either greater than 22 weeks gestation or had a birthweight greater than 500g that had died before the onset of spontaneous labour (SOL) or

the induction of labour (IOL) process. Delivery options were decided after a discussion between the patient and her attending medical staff.

The results reflect the background and pregnancy outcomes of 125 women who went into SOL and 363 women who underwent IOL.

This audit was authorised by the local audit committee (Aqua 2024-02-01).

Results

Tests for normally distributed data indicate that maternal age, birthweight, BMI and labour duration in the 1st, 2nd, 3rd stages and total labour duration were not normally distributed (Shapiro-Wilk 0.98, 0.96, 0.84, 0.50, 0.43, 0.08 and 0.46 respectively. All p<0.001). Non-parametric tests were therefore used.

The methods of IOL were varied and often combined but the commonest used methods were misoprostol, prostaglandin compounds and mifepristione.

Figure 1 demonstrates that 95.2% and 97.2% in the SOL and IOL groups delivered vaginally without assistance.

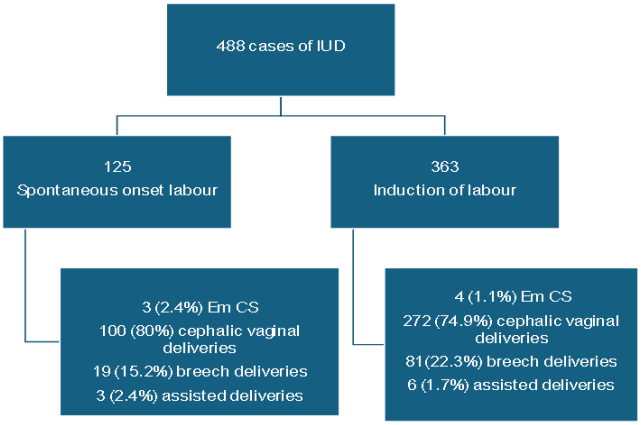

Figure 1 The mode of delivery in 488 women who had a stillborn baby before the onset of labour or induction of labour.

Chi-sq 3.98, p=0.26 (NS)

Table 1 indicated that there were significantly more hypertensive women in the IOL group (15.4% v 5.6%, p<0.01) and the median birthweight was significantly higher in the SOL group (2147g v 1697g, p<0.001). There were no other significant difference between the 2 groups.

Table 1 The characteristics of 488 women who delivered a stillborn baby divided by those who went into spontaneous labour (n=125) and those who underwent an induction of labour (n=363)

	Spontaneous labour N=125	Induction of labour N=363	Odds ratio (95% CI)	Significance testing
Median (range) maternal age	30.1 (16-42)	31.1 (15-45)		Mann Whitney U 1.3, p=0.19 (NS)
Median (range) birthweight***	2147 (100-4705)	1697 (130-5460)		Mann-Whitney U -3.94, p<0.001
Median (range) BMI	25.6 (17.6-45.6) (n=72)	26.7 (17.4-72) (n=255)		Mann-Whitney U 1.5, p=0.14 (NS)
Number of primiparae n (%)	48 (38.4%)	174 (47.9%)	1.5 (0.98-2.2)	Chi-sq 3.41 P=0.07 (NS)
Previous Caesarean sections n (%)**	19 (15.2%)	43 (11.8%)	0.8 (0.4-1.3)	Chi-sq 0.94 P=0.33 (NS)
Female sex n (%) ****	55 (44.7%)	166 (46.5%)	1.1 (0.7-1.6)	Chi-sq 0.12 P=0.73 (NS)
Hypertension in pregnancy or labour n (%)	7 (5.6%)	56 (15.4%)	3.1 (1.4-6.9)	Chi-sq 7.99 P<0.01
Previous/current medical problems n (%)	28 (22.4%)	89 (24.5%)	1.1 (0.7-1.8)	Chi-sq 0.08 P=0.78 (NS)
Recorded episodes of vaginal bleeding*	28 (22.4%)	75 (20.7%)	0.9(0.6-1.5)	Chi-sq 0.17 P=0.68 (NS)
Pyrexia in labour n (%)	8 (6.4%)	16 (4.5%)	0.7 (0.3-1.6)	Chi-sq 0.79 P=0.37 (NS)
Delivery gestation 22-31 w n (%)	49 (39.2%)	164 (45.2%)		Chi-sq 4.3 p=O.11 (NS)
Delivery gestation 32 -36 w n (%)	24 (19.2%)	85 (23.4%)		
Delivery gestation37-42 w n (%)	52 (41.6%)	114 (31.4%)		

* 6 women unknown

** 1 woman unknown

*** 36 cases missing

****8 indeterminate sex

Citation: Coyne C, Lindow SW, Thomas M, et al. Intrauterine fetal death management: A retrospective comparative study of induction of labour and spontaneous onset of labour. *Obstet Gynecol Int J.* 2026;17(2):76–79. DOI: 10.15406/ogij.2026.17.00827

In Table 2 the durations of the 1st stage, 2nd stage, 3rd stage and total labour duration are not significantly different.

Table 2 The characteristics of labour in 488 women who delivered a stillborn baby that was not alive at the start of labour or induction of labour

	Spontaneous labour N=125	Induction of labour N=363	
Median (range) duration of 1st stage labour (h:min)	2:32 (0-30:30)	2:17 (0-110:02)	Mann-Whitney U -0.10, p=0.92 (NS)
Median (range) duration of 2ndt stage labour (h:min)	0:10 (0-15:26)	0:10 (0-26:34)	Mann-Whitney U -1.09, p=0.28 (NS)
Median (range) duration of 3rd stage labour (h:min)	0:08 (0-96:10)	0:08 (0-4:35)	Mann-Whitney U 0.49, p=0.62 (NS)
Median (range) total duration of labour (h:min)	3:11 (01-117:0)	3:15 (0-110:03)	Mann-Whitney U -0.13, p=0.90 (NS)

36 cases, 23 cases and 22 cases had missing data on the duration of 1st, 2nd stages and total duration of labour respectively.

Discussion

The outcome of delivery in 488 patients (125 who had SOL and 363 who had IOL) who underwent a trial of vaginal delivery is presented.

It is clear from the results displayed that there is a 3:1 ratio in favour of IOL vs expectant management by waiting for SOL. This likely represents conventional treatment that has become standard practice with the aim to effect safe delivery and reduce the distress for both patient and partner. As this audit is a description of clinical practise the 2 groups were not randomised or chosen with any specific criteria. The management was decided by the attending medical staff after discussion with the patient. As the 2 groups were not chosen by any allocation process, it makes intergroup comparisons difficult however the aim of the study was to examine labour duration and outcomes and these results represent clinical practise.

Comparing the outcome of expectant management vs induction of labour in achieving a successful cephalic vaginal delivery there is no significant difference between the two groups with 80% in the expectant management group vs 74.9% in the induction group (p= 0.26, NS). A concern of clinicians is the risk of adverse events arising from the delay associated with expectant management. These complications include intrauterine infection and DIC which has a 10% chance of occurring within 4 weeks.[2] However this concern is offset by the fact that 90% of women deliver within 2 weeks of an IUD.[5] The occurrence of pyrexia in labour (indicating intrauterine infection) is not significant when comparing the two cohorts. Pyrexia occurred in labour in 6.4% in the expectant patients and 4.5% in the induction of labour patients (p=0.37, NS). The fear of adverse outcomes is warranted however it should be balanced by the potential benefit of expectant management.

Close examination of the two cohorts in terms of gestational age/ delivery gestation does not show any significant difference between the two groups, however the SOL group had a median birthweight 450g greater than the IOL group. This non significance allows us to infer that gestational age is not a deciding factor when deciding on using expectant management over the induction process.

Underlying pregnancy health concerns play a key part in risk stratifying patients and can impact on the decision for expectant vs induction management. From the data examined there is a significant difference between the groups and this could have a bearing on the cause for intrauterine fetal death. Hypertension occurs in 8-10% of all pregnancies and contributes to 9.2% of stillbirths.[6,7] Hypertension that develops in pregnancy typically resolves with the delivery of the fetus as it is usually associated with a uteroplacental issue. Uncontrolled or evolving hypertension can lead to significant risk to the patient with the development of preeclampsia and later eclampsia. It would be prudent to expedite the delivery with an induction if there is ongoing hypertensive disease. Accordingly in this study there is a significantly greater incidence of hypertensive disease in the IOL group (15.4 vs 5.6%, p < 0.01).

This data answers a key question; whether overall expectant management vs induction of labour has any impact on the overall labour process i.e. does proceeding with induction shorten the time spent in labour. Considering the median time for each stage of labour there is no significant impact on the duration from SOL and IOL processes. Examination of the 2nd stage shows an equal median length of 10 minutes (p =0.28) and the 3rd stage also shows an equal median length of time of 8 minutes (p= 0.62). All 3 stages show non statistical difference in duration. This lack of superiority needs to be highlighted to patients when making the decision on expectant management vs IOL. This data provided a number of data points that one would assume would skew the results towards one group or another. Maternal age, BMI, primiparity and number of previous caesarean sections are all not significantly different between the 2 groups. Within our data we did use length of stay as a data point to investigate however published research has shown a significant reduction in length of stay for expectant management vs IOL (p < 0.001) which is an important factor that we should highlight when counselling a patient on management. This is something that should be looked at in more detail in future research.

This audit is retrospective and examination of the long term outcomes in terms of psychological complications is beyond the scope of the data. However when discussing management of an IUD with a woman the psychological impact that this will have is a key concern when agreeing on a management plan. Data published looking at the psychological complications (anxiety) after stillbirth gives a ratio of 4.8 comparing those that had a delay of 25 hours or more until the start of delivery vs those that went into labour before 25 hours.[8] These findings suggest that it is advisable from a psychological perspective to induce labour as soon as possible. This is an area that warrants further research.

Examination of median birth weight does show a difference between the two groups with the expectant management showing a higher median birth weight at 2147g vs 1697g for the induction group (p = 0.001). The 450g reduction in median birthweight in the IOL group may reflect the increase in hypertensive disease in that group. There is no statistical difference for the delivery gestation and thus we are unable to link the higher birthweight to gestation based on the data however published research shows that patients with more advanced

gestational age and larger cervical dilation are more likely to opt for expectant management with the expectant cohort having a higher birth rate ($p = 0.015$).[9]

A high risk situation is those that have experienced an IUD and have had a caesarean section previously. Published data give a success rate of 86.7% for vaginal birth however there was a 3.4% uterine rupture rate within the IOL cohort and none within the expectant management cohort.[10] The RCOG Birth after Previous Caesarean Birth puts risk of uterine rupture at 0.5% when undergoing a VBAC (vaginal birth after caesarean) with an IUD.[11] Whether SOL offers a reduced risk of uterine rupture versus IOL is not well studied and the current data set does not inform that debate as there were no uterine ruptures.

Conclusion

An IUD is a devastating diagnosis for patients to experience and it is imperative for clinicians to safely effect delivery. The current study based on clinical practise indicates that both SOL and IOL are equally effective strategies for otherwise healthy women. Thus for healthy women with an IUD there will be a discussion that will be based on the patient and her partner's wishes and not medical superiority. Thus the Irish National Clinical Practice Guideline for Stillbirth endorsing both expectant management, if no contraindications, and also expediting labour with an IOL is valid.[12]

Further work is necessary to clarify and risks or benefits to the choice of IOL or SOL.

Acknowledgments

None.

Personal Relationship

We have no personal relationships with any individuals or organisational entity that might impart bias to our work.

Funding

We have received no financial support or funding from any organisation or entity that could potentially influence or bias the research or results.

Conflicts of interest

None of the authors have any financial interest with any organisations or entities that could be viewed as influencing this research or data that is presented in this body of work.

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