

# Abnormal labour

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## Abstract

The term abnormal labour, or labour dystocia, refers to a situation when there is slow or no progress in labour. Abnormal labour is associated with an increased risk of adverse perinatal outcomes for both mother and baby which include bleeding, sepsis, operative vaginal and abdominal delivery, as well as newborn admission to the neonatal unit. To understand what an abnormal labour is, it is important that the reader understands what is meant by normal labour first. This will help to understand how normal labour can incrementally drift into the sphere of “abnormal or dysfunctional labour”. The article will also address how to manage abnormal labour.

**Keywords** abnormal labour; failed induction; intrauterine death; labour dystocia; normal labour; partogram; prolonged labour

## Introduction

Normal labour is defined as uterine contractions that result in progressive dilatation and effacement of the cervix. It was Friedman who first described the three stages of labour in 1955. Since then, The World Health Organization (WHO) and National Institute of Clinical Excellence (NICE) have elaborated further on these three stages of labour:

1. First stage of labour: This stage lasts from the onset of uterine contractions and ends when the cervix is fully dilated (10 cm). First stage is further subdivided into two phases:
  - a. Latent phase: characterized by regular or irregular uterine contractions that lead to cervical dilatation and effacement up to 4 cm. This can last hours or days.
  - b. Active phase or established labour: This phase is characterized by regular uterine contractions and should achieve cervical dilatation from 4 cm to 10 cm. According to NICE, a cervical dilatation of 0.5 cm per hour is an acceptable rate of progress during this phase in labour.
2. Second stage of labour: This starts from full cervical dilation (10 cm) and ends with the delivery of the fetus. It is also subdivided into two phases:
  - a. Passive stage: The head descends in the pelvis and there is no urge to push.
  - b. Active stage: There is strong urge to push or there are active maternal efforts.

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3. Third stage of labour: This stage lasts from the delivery of the fetus to the delivery of the placenta and membranes. This could be managed actively or physiologically.
  - a. Active management of the third stage lasts up to 30 min and involves a package of care with the following components:
    - i. Routine use of uterotonic drugs.
    - ii. Deferred clamping and cutting of the umbilical cord.
    - iii. Controlled cord traction after signs of separation of the placenta.
  - b. Physiological management of the third stage lasts up to 60 min and involves a package of care that includes the following components:
    - i. No routine use of uterotonic drugs.
    - ii. No clamping of the umbilical cord until pulsation has stopped.
    - iii. Delivery of the placenta by maternal effort.

## Management of labour

Regular observations in labour are necessary. Collecting these observations and interpreting them in a timely manner helps to identify deviation from the norm into “abnormal labour” and enables carers to offer appropriate management, thus reducing complications. For that reason, one-to-one care in labour must be provided in all settings. This includes homebirth, freestanding midwifery units, alongside midwifery units and obstetric units. Tables 1 and 2 provide a list of the observations and the frequency with which they need to be recorded. Once a diagnosis of first stage of labour has been made these vital observations should be recorded on a partogram, as shown in Figure 1.

A *partogram* shows key observations being plotted systematically along a time axis, improving the assessment of progress during labour and also the diagnosis of abnormal labour. When the information plotted is regularly reviewed, a partogram can influence the recognition of the need for augmentation of labour, or other interventions.

In healthy women, with normal outcomes from labour, the active phase (cervical dilation 4–10 cm) is said to normally have a duration of 4–8 h in nulliparous women and 2–5 h in parous women.

Progress in labour is plotted against time to show progress in cervical dilatation and descent of the presenting part in the pelvis. There is also documentation of maternal observations (pulse, blood pressure, temperature and urine output), foetal observations (foetal heart rate per minute), frequency and intensity of uterine contractions, the use of medications such as oxytocin, and analgesia including epidural. An *alert line* is drawn to show the expected progress (this could be either 0.5cm/hour or 1 cm/h) in labour. When the rate of 1 cm dilatation per hour is used, then another *action line* parallel to the alert line and 4 h later is also drawn to allow for patients with slower progress of labour at 0.5 cm per hour. The normal progress in labour will be to the left of the alert line and crossing it to the right means that interventions can be offered to improve progress.

Achieving normal labour requires three elements to work in harmony. These are known as the three ‘Ps’. These are:

### Observation in first stage of labour

Parameter	Latent first stage	Active first stage
Blood pressure	Every 4 h	Every 4 h
Temperature	Every 4 h	Every 2 h
Pulse rate	Every 30–60 min	Every 30–60 min
Foetal heart rate	Every 30 min	Every 15 min
Contractions	Every 1 h	Every 30 min
Cervical dilatation	Every 4 h	Every 4 h
Head descent	Every 4 h	Every 4 h
Colour of amniotic fluid	Every 4 h	Every 4 h
Moulding	Every 4 h	Every 4 h

**Table 1**

**The passage:** that is the pelvic shape and diameters or the space provided by the pelvis. This could be affected by rickets or pelvic fractures which may result in deformities of the shape and diameters of the pelvis. Other causes include a small pelvis and small stature (compared to the size of the fetus), pelvic tumours, and a full bladder. These conditions may prevent engagement or descent of the presenting part into the pelvis. The female pelvis has four shapes. The commonest (50%) and most favourable in Caucasian women is the *gynaecoid pelvis*; it has an almost round inlet (Anteroposterior diameter of 11 cm and transverse diameter of 13 cm) allowing head engagement and descent through its wide subpubic arch. The *android pelvis* is more common in tall women and has a triangular inlet and narrow subpubic arch. The third type is the *anthropoid pelvis* which is characteristic of black women; the inlet is similar to the gynaecoid pelvis, but turned 90 degrees. The fourth is the *platypelloid pelvis* (3%) and has a kidney shape inlet. The second and third pelvic shapes increase the incidence of occipito-posterior positions. Engagement of the foetal head is less likely with a platypelloid pelvis.

**The passenger:** this refers to the fetus. Problems with labour could arise secondary to the large size of the fetus (macrosomia), congenital abnormalities preventing engagement, flexion and rotation (severe hydrocephalus or foetal neck mass), or from malposition of the foetal head. For example, a well flexed head in the direct occipito-anterior position (DOA) will have a diameter of 9.5 cm (suboccipito-bregmatic), compared to a direct occipito-posterior position (DOP) which will have a diameter of 11.5 cm

(occipito-frontal diameter) due to deflexion of the foetal head. When the head is partially deflexed, it has a presenting diameter of 10.5 cm (suboccipito-frontal). Correction of the flexion will improve progress of labour.

**The powers:** this refers to the uterine contractions in the first and second stage. The strength of uterine contractions plays an important role in the progress of labour. For example, in 20% of cases the occiput is posterior at the beginning of labour. With good uterine contractions in almost 90% of these cases the vertex will rotate to an occipito-anterior position. During the second stage, extra powers are added by maternal efforts (pushing).

It is also important to understand the process by which the head passes through the pelvis, in order to diagnose abnormal labour and address delays effectively. Delivery of the head occurs as follows:

1. Engagement of the foetal head in the transverse position
2. Descent and flexion of the foetal head
3. Internal rotation; the foetal head rotates 90 degrees to the occipito-anterior position
4. Delivery by extension; the foetal head remains flexed, chin on chest, so that the back or crown of its head leads the way through the birth canal, until the point when the back of its neck presses against the pubic bone. The chin leaves the foetal chest, extending the neck, as if to look up, and the rest of the head passes out of the birth canal
5. Restitution; the foetal head turns through 45 degrees to restore its normal relationship with the shoulders, which are still at an angle
6. External rotation; the shoulders repeat the corkscrew movements of the head, reflected in the final movements of the foetal head

### Abnormal labour

Technically, this includes any abnormalities during the first two stages of labour although the term ‘abnormal labour’ usually refers to abnormalities in the active phase of first stage, and the second stage of labour.

Examples of abnormal labour include slow or arrest in cervical dilatation, suspected foetal compromise, sepsis, failure of the presenting part to engage or descend in the pelvis, reduced frequency of uterine contractions, or incoordinate uterine activity.

### Observation in second stage of labour

Parameter	Passive second stage	Active second stage
Contractions	Every 30 min	Every 30 min
Blood pressure	Every 60 min	Every 60 min
Temperature	Every 4 h	Every 4 h
Vaginal assessment	Every 1 h or in response to women wishes	Every 1 h or in response to women wishes
Maternal wellbeing and effectiveness of pushes	Continuous	Continuous
Maternal pulse	Every 15 min to differentiate from foetal pulse	Every 15 min to differentiate from foetal pulse
Foetal pulse	Every 5 min, for 1 min	After each contraction, for 1 min

**Table 2**

Partogram

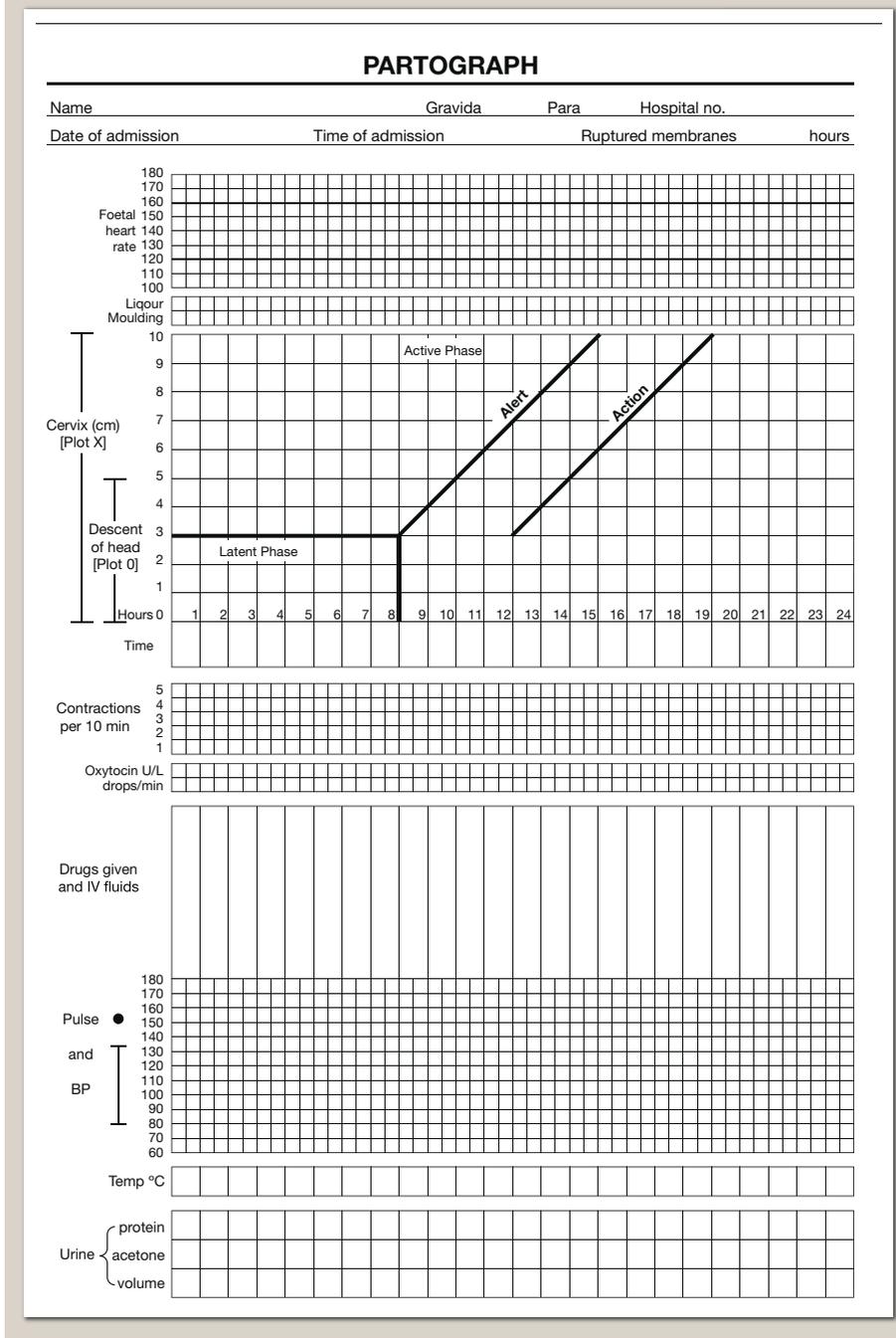


Figure 1

The guidelines for accepted timelines of normal labour are mainly based on observational studies and data derived from deliveries with good maternal and neonatal outcomes. It is important to diagnose abnormal labour early so that interventions can be offered to improve progress and therefore reduce maternal and foetal morbidities inherent in poorly managed prolonged labour.

Abnormal progress in labour is diagnosed when the rate of dilatation falls to the right of the projected normal labour curve plotted on the partogram. Abnormal labour progress is

usually caused by a problem in one of the three P's, or a combination.

Delay in the first stage of labour is suspected if there is cervical dilatation of less than 2 cm in 4 h. Delay in the second stage of labour is diagnosed once the timelines as explained in practice point 1 have been exceeded. Patients with epidural analgesia are allowed an extra hour of passive second stage.

Once abnormal labour (delay or arrest) is diagnosed, the woman and her baby will need to be assessed carefully so that a cause is identified and can be addressed.

Once labour is abnormal there is increased risk of morbidity and mortality for both the mother and her baby.

The increased risks associated with abnormal labour include:

1. Postpartum haemorrhage could occur as a result of a distended uterus with a macrosomic baby, poor uterine tone following birth because of prolonged labour, and tachyphylaxis following prolonged oxytocin augmentation, or even birth trauma secondary to the assisted delivery of a malpositioned fetus
2. Sepsis is more likely with prolonged labour or prolonged rupture of the membranes, often with multiple internal examinations. However, sepsis itself may contribute to poor progress with acidosis, dehydration and the infection itself negatively impacting on uterine contractions
3. Instrumental delivery
4. Emergency caesarean section
5. Admission to HDU/ITU
6. Blood transfusion
7. Admission of the newborn to the neonatal unit with sepsis, hypoxia, acidosis or birth trauma
8. Psychological trauma to mother and her partner

### Case 1

KS is a 32-year-old, Gravida 2 Para 1. She had a caesarean section (CS) in her first labour due to foetal distress at 6 cm cervical dilation, delivering a baby weighing 3.7 kg. Her antenatal care during her current pregnancy has been uncomplicated. She is keen for a trial of vaginal delivery. She has been counselled antenatally about the 1 in 200 risk of scar dehiscence/rupture and has been given a 70–75% chance of delivering vaginally. A leaflet for vaginal birth after CS (VBAC) has been provided. She is also aware of the alternative option of requesting an elective repeat caesarean section (ERCS).

She presents at 38 + 5 weeks in spontaneous labour. The foetal head is 2/5<sup>th</sup> palpable abdominally and the cardiotocograph (CTG) is normal, showing moderate uterine contractions with a frequency of 3 in 10 min. Her partogram is shown in [Figure 2](#).

Vaginal assessment reveals cervical dilation of 6 cm, with intact membranes, and the presenting part (the vertex) is at the level of ischial spines (0 station). A plan is made to reassess the progress of labour in 4 h time.

She has continuous CTG monitoring, as per NICE guidelines. Two hours later, she is coping well with uterine contractions without any form of analgesia, but a reduction in the intensity and frequency of her uterine contractions to 2 every 10 min is noted. The woman is offered an assessment earlier than previously planned and vaginal examination shows no change in cervical dilation or descent of the foetal head. After discussion with the patient, it is agreed that an artificial rupture of the membranes (ARM) will be performed. Clear liquor is noted and she is encouraged to mobilize. Assessment in a further 4 h shows that the cervix has now dilated to 8 cm and the vertex is still at the level of the ischial spines, probably in an occipito-posterior position. She has been contracting 2–3 in 10. A further assessment is carried out 2 h later and there is no change in her cervical dilatation. Following discussion with the patient, a decision is made to deliver her by an emergency CS, due to failure to

progress in the first stage of labour (class II CS). The baby is born with good Apgar scores, and a birth weight of 4.3 Kg. She sustains an estimated blood loss of 900 ml.

### Discussion

This lady was appropriately counselled, with all options for different modes of delivery offered in line with the Montgomery ruling. Following an informed discussion, she opted for a VBAC. It is recognized that VBAC when successful, carries the least risk for the woman compared to ERCS and emergency CS.

The success of VBAC is higher in patients who present in spontaneous labour. She was assessed at the time of admission to the labour ward. It was anticipated that as her uterine contractions were strong enough, she would be able to achieve full cervical dilation within 4 h during the accelerated phase of labour and that there was a high probability of achieving VBAC.

A partogram was started at admission to the labour ward. It is important to predict optimal progress on the partogram, and to plot actual progress against it. On this occasion, it was anticipated that cervical dilation would be at least 0.5cm/hour, as defined in the NICE guidance. Therefore, it was expected that the first stage of labour in this woman would last a maximum of 8 h following admission to the labour ward.

However, her partogram showed that the uterine contractions became less frequent 2 h following her admission. The options at that time would be either to continue with careful monitoring and reassess her 4 h after her initial assessment, as previously planned, or to consider augmentation of labour. The first option could lead to a prolonged labour and a delayed diagnosis of failure to progress. The second option however would involve offering an intervention at this stage. Performing ARM has been shown to reduce the duration of labour. There is no evidence to suggest that such an intervention will increase the risk of operative delivery, or adverse neonatal outcome.

The suspected delay in progress of labour was confirmed and labour was augmented. The best and safest option would be to perform artificial rupture of the membranes.

It is recommended that a repeat vaginal examination is performed 2 h following amniotomy to confirm that the membranes have actually been ruptured. This was not performed in this case, however it could be argued that there has been an increase in uterine contractions as noted on the partogram and that this is indirect evidence that amniotomy has been successful.

It is usually accepted that in order to achieve satisfactory progress in labour, most women need to experience an average of 3–4 strong uterine contractions every 10 min. The strength of the contractions can only be assessed subjectively although the frequency can be readily determined by palpation, or the use of the tocograph.

This patient experienced only 2–3 moderate uterine contractions in 10 min following the ARM, and this is regarded to be only moderate uterine activity. In general, oxytocin use can increase the frequency and strength of uterine contractions but this option was not offered to this patient as Syntocinon augmentation is associated with an increased risk of uterine rupture in women with a history of previous caesarean birth.

Dysfunctional contractions are common in primiparous labours, and much less so in parous women where cephalopelvic disproportion (CPD) is a more likely cause of poor progress in

Partogram of Case 1

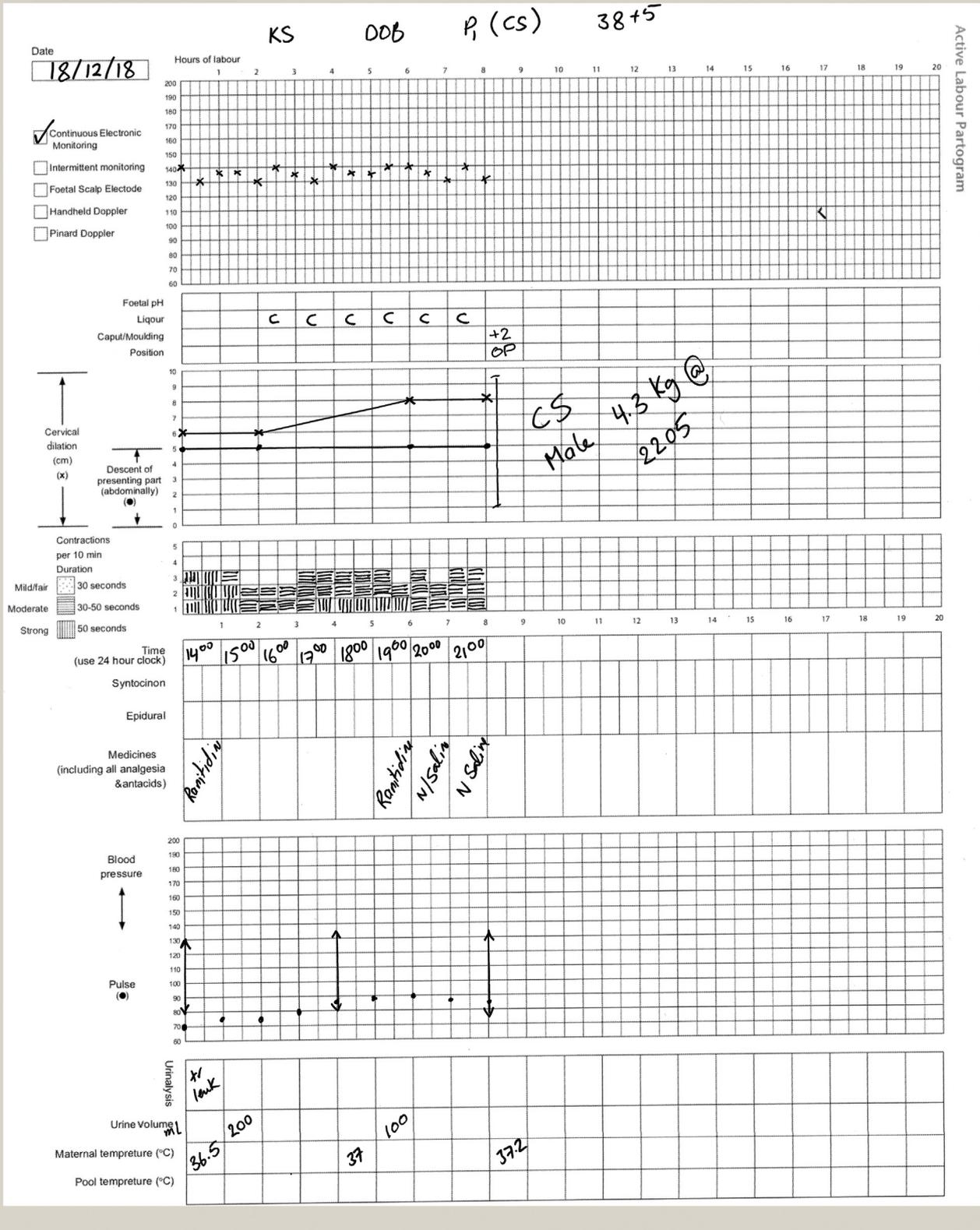


Figure 2

Partogram of Case

Active Labour Partogram

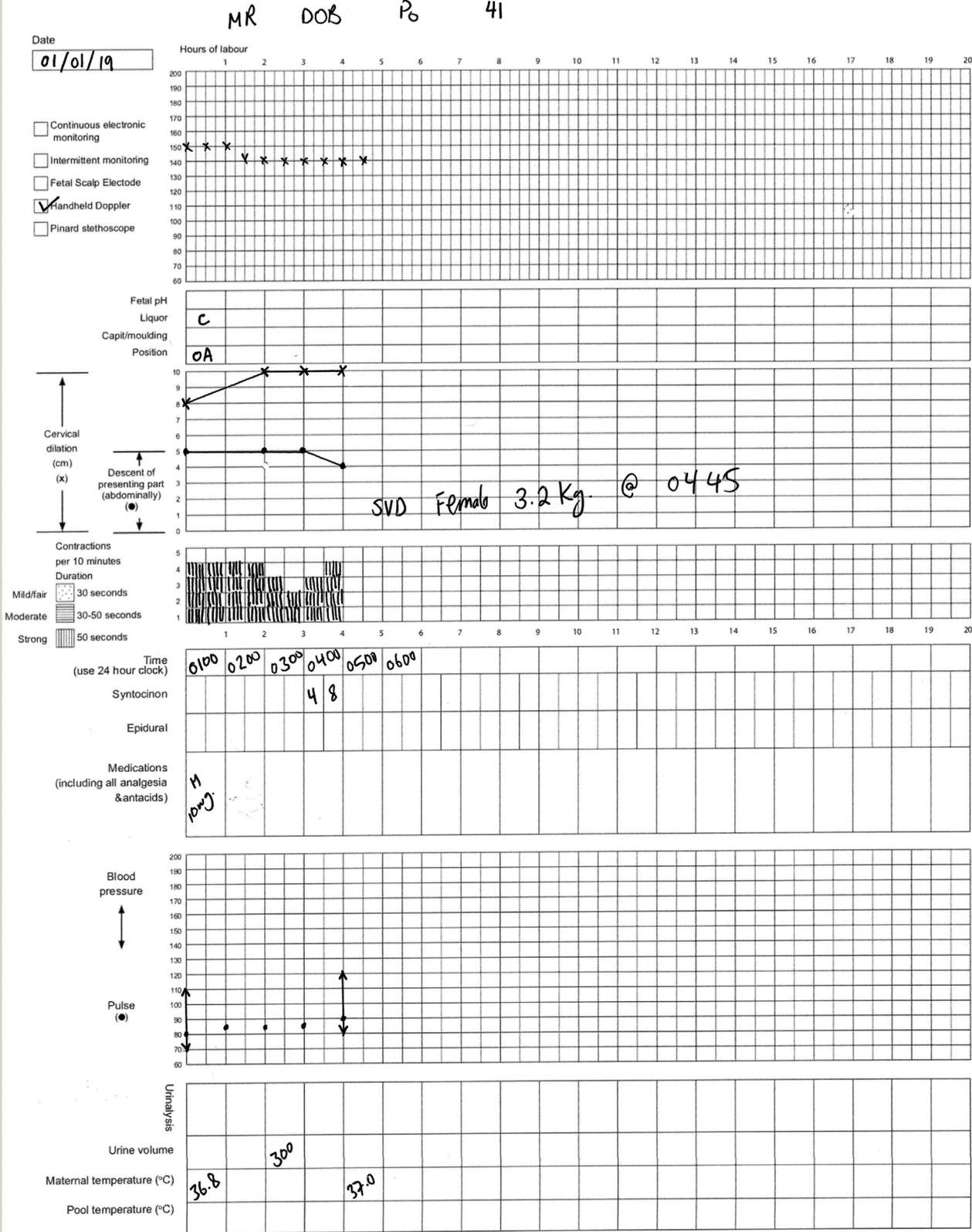


Figure 3

labour. CPD can be either due to the size of the baby or to malposition of the head causing a wider part of the head to present. Augmentation of labour will quite often correct malposition on many occasions but obviously will not overcome 'true' CPD. In a patient with a previous CS, there is a 2–3-fold increased risk of uterine rupture following Syntocinon augmentation and hence the decision for an emergency CS. However, Syntocinon is not absolutely contraindicated in this situation and some would have supported a short period of Syntocinon augmentation if there were no signs of obstructed labour (excessive caput and moulding) on vaginal examination, preferring to believe that despite her parity, dysfunctional contractions were the cause of her poor progress. It would have been appropriate to discuss the options and associated risks with the patient, and to document the outcome of this discussion in the notes.

In primigravid women, the slowing of contractions is relatively common and is usually secondary to uterine inertia. An unscarred primiparous uterus is highly unlikely to rupture if true obstruction in labour occurs and this is why augmentation with Syntocinon in primigravid women is so much more common and is generally considered much safer than in parous women, where uterine rupture can occur even in the absence of a uterine scar.

## Case 2

MR is a 25 year-old primigravida, with a BMI of 23, and no other risk factors. She has an uncomplicated antenatal course.

She presents at 41 weeks in spontaneous labour, with 3–4 moderate uterine contractions every 10 min. Her vital observations are normal and she had a cephalic presentation 2/5<sup>th</sup> palpable above the pelvic brim. Vaginal assessment confirms an effaced cervix, 8 cm dilated with the vertex being found at the level of the ischial spines in an occipito-anterior position. Her membranes are intact but rupture spontaneously during examination. She drains clear liquor.

A partogram is started (Figure 3). Foetal heart rate monitoring is normal, and 2 h later her cervix is fully dilated with the vertex still at the level of ischial spines (0 station).

An hour after this, she is re-assessed. Her contractions have reduced to 2 in 10 min. Her vaginal examination remains unchanged and she has no urge to push.

An intravenous oxytocin infusion is started, and the frequency of uterine contractions increases to 3–4 in 10. An hour later, she starts to push and she has a spontaneous vaginal delivery 40 min later.

## Discussion

A spontaneous onset of labour is the best predictor of successful vaginal delivery. She was admitted in advanced first stage of labour, another positive predictor of good outcome. Her progress in labour continued at a rate of 1 cm per hour.

There is now increasing evidence to support less strict criteria for defining 'normal' progress in labour. A rate of dilatation of 0.5cm/hour has been adopted. It would have been appropriate to

examine this woman 4 h following her initial examination, although expediting this would have been indicated once the contraction frequency declined.

Normal practice would be to start pushing after 1 h of passive second stage, on this occasion, active pushing was not encouraged. This seems reasonable due to the slowing of contractions and absence of urge to push. If active pushing was to be encouraged, it may take longer to achieve spontaneous vaginal delivery due to the reduced total number of contractions. Allowing an extra hour to augment contractions even in the absence of epidural, is acceptable and safe as long as there is no maternal or foetal distress. Most labour guidelines recommend a maximal duration of second stage of 3 h in nulliparous women, and 2 h in parous women. ◆

## FURTHER READING

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## Practice points

- Delay in the first stage of labour is said to occur when cervical dilatation occurs at less than 0.5 cm/h
- There may be problems with the Passenger, the Passages or the Powers
- Make a diagnosis for the cause of poor progress in labour, before making a plan for the rest of the labour
- Augmentation of labour by ARM, or use of Syntocinon, may shorten labour, but do not significantly affect the final mode of delivery
- Take great care in the use of oxytocin to augment uterine contractions in spontaneously labour parous women, or those with a history or previous CS
- The second stage of labour should not last longer than 3 h in nulliparous women, or 2 h in multips