

## When the Stork Arrives Unannounced – Seven Years of Emergency Deliveries in a Non-obstetric General Hospital

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### Abstract

**Introduction:** Emergency department deliveries are uncommon in the Singapore setting, but when they do occur, the emergency physician has to be able to deliver the child safely, perform neonatal resuscitation if needed, and try to prevent any birth trauma to the child or complications of delivery in the mother. We present our experience of emergency room deliveries spanning 7 years in a community hospital without obstetric or neonatal backup. **Materials and Methods:** This is a retrospective case series. A search was made through our electronic medical records system for patients presenting in labour or with deliveries from March 1997 to October 2004. They were studied for demographic and social factors, gravidity and parity, as well as any complications (during birth and in the immediate post-delivery period) in both parent and child. **Results:** Twenty-three patients presented to our emergency department with labour contractions, and 14 progressed to vaginal deliveries. Twelve were single mothers who had hidden their pregnancies, while another 2 married patients had unsuspected pregnancies. No neonate needed resuscitation or airway support, but there were 4 patients without episiotomy who sustained perineal tears, and another 2 patients in whom the placenta could not be delivered. A child (born to a single mother without antenatal care) had a low Apgar score, but improved with oxygen and suctioning. **Conclusions:** An emergency department in a non-obstetric hospital should have in place adequate preparations to cater for the occasional unexpected emergency delivery and the associated need for neonatal resuscitation. In our series, there was a high proportion of concealed (hidden) and “unaware” pregnancies presenting in labour. Prompt referral to a maternity hospital with neonatal care should be made for any complications.

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**Key words:** Birth trauma, Childbirth, Emergency department, Retained placenta, Single mothers, Vulvovaginal tears

### Introduction

Emergency department (ED) deliveries are uncommon in the Singapore setting, as patients presenting with labour to the ED are sent to the obstetric suites in Kandang Kerbau Women’s and Children’s Hospital (KKH), National University Hospital (NUH) and Singapore General Hospital upon arrival. The same applies to the various private hospitals with obstetric services in Singapore. Tan Tock Seng Hospital and Alexandra Hospital do not have obstetric services, but are in close proximity to KKH and NUH respectively. However, Changi General Hospital (CGH), which is a community hospital located in the east of Singapore, has no immediate access to obstetric delivery or paediatric services. Residents in the eastern part of Singapore can take between 20 to 30 minutes, depending on traffic

conditions, to travel to our designated maternity hospital (KKH). As such, we have encountered patients in the surrounding residential areas coming into our ED in advanced stages of labour. Our emergency physicians have to be able to deliver the child safely, perform neonatal resuscitation if needed, and try to prevent any birth trauma to the child or complications of delivery in the mother. We decided to study the demographics and outcomes of emergency room deliveries spanning 7 years in our community hospital, without obstetric and neonatal backup.

### Materials and Methods

This is a retrospective case series of a descriptive nature. A computerised search was made of our electronic medical records system for obstetric patients presenting with labour

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Table 1. Characteristics of Patients Presenting with Symptoms and Signs of Labour

S/N	Age	Race	Gravida	Para	Married	Antenatal care	Management
1	19	Malay	3	2	Yes	Yes	Delivered in emergency department by staff
2	40	Malay	4	3	Yes	Yes	
3	26	Indian	4	3	Yes	Yes	
4	26	Eurasian	2	0	No	Hidden	
5	21	Chinese	1	0	No	Hidden	
6	27	Chinese	2	1	Yes	Yes	
7	27	Chinese	3	2	Yes	Yes	
8	18	Chinese	1	0	No	Hidden	
9	38	Chinese	2	1	Yes	Yes	
10	16	Chinese	1	0	No	Hidden	
11	20	Malay	1	0	No	Hidden	
12	33	Malay	3	2	Yes	Yes	
13	15	Malay	1	0	No	Hidden	
14	31	Chinese	3	2	Yes	Yes	Delivered in emergency department by obstetrician
15	35	Chinese	1	0	Yes	Unaware of pregnancy	Transferred to KKH for delivery
16	18	Chinese	1	0	No	Hidden	
17	26	Malay	1	0	No	Hidden	
18	21	Malay	1	0	No	Hidden	
19	25	Malay	3	0	No	Hidden	
20	15	Chinese	1	0	No	Hidden	
21	31	Malay	1	0	Yes	Unaware of pregnancy	
22	23	Malay	1	0	No	Hidden	
23	27	Malay	2	1	Yes	Yes	

pains, or who delivered in our ED, between March 1997 and October 2004 (patients coded with ICD9 - 650). They were studied for demographic and social factors, gravidity and parity, as well as any complications (during birth and in the immediate postpartum period) in both parent and child. The diagnosis of pregnancy was classified as known (confirmed with an obstetrician and thereafter had antenatal care), hidden (patient suspected she was pregnant but did not come forward to have it confirmed, and had no antenatal care) or undiagnosed (unsuspected and hence missed by patient). Their progress, after transfer to the maternity hospital, was also monitored for any immediate post-delivery complications. This was accomplished by reviewing the relevant case notes, or by speaking to the doctors involved in postpartum care. Patient telephone interviews were also carried out to clarify any features of the history that were not available in the charts.

## Results

The ED of CGH attends to about 120,000 patient visits a year. Twenty-three patients presented with labour pains to our ED over a 7-year period, i.e., approximately 1 in every 37,000 patient visits. (No patient had ever been inadvertently admitted to the inpatient wards with undiagnosed labour from the ED.) There were 11 Malays, 10 Chinese, 1 Eurasian and 1 Indian. Twelve were single mothers who had sought to hide their pregnancies and thus

had had no antenatal care. In this group, their ages ranged from 15 to 26 years; the mean age was 20.3 years (6 were below the age of 21 years). Initial triage complaints by the single mothers included “diarrhoea”, “abdominal pain”, or “bleeding per vaginum”, before the examination revealed the true reason for their attendance. The mean age of the group of married mothers was 30 years. Two of the married mothers were surprised to learn they were pregnant and in labour, as they had long histories of irregular cycles and had not paid attention to their missed periods. As such, they also had had no antenatal care. The distribution of their gravidity and parity is listed in Tables 1 and 2.

Six patients presented between 8 am and 4 pm, 9 patients between 4 pm and midnight, and 8 patients between midnight

Table 2. Comparison of the 2 Groups of Patients that Delivered in Changi General Hospital Emergency Department (CGH ED) or at KK Women's and Children's Hospital (KKH)

	Delivered in CGH ED	Delivered at KKH
Number of patients	14	9
Mean age (y)	25.5	24.5
Age range (y)	15 to 40	15 to 35
Number of primiparous patients	6 (45.9%)	8 (88.9%)
Mean parity	1.14	0
Range of parity	0 to 3	0 to 1

and 8 am; there was no discernible peak. All had come to the ED by means other than an ambulance (i.e., had walked in, or had been sent to the ED in private vehicles or taxis).

Nine patients were in early labour, in the latent phase of stage 1. They had show, widely spaced contractions and dilatation of the cervix of <5 cm. They were transferred urgently to KKH (these included the 2 patients with undiagnosed pregnancies).

The remaining 14 patients were in active labour, as evidenced by closely spaced contractions, effacement and dilatation of the cervix of >5 cm. They had to be delivered in our ED, as transferring them to KKH for delivery was deemed too late and to carry unacceptable risks. Eight of the 9 patients in the latent phase of stage 1 were primiparous, while 8 of the 14 patients (57%) delivered in the ED had a parity of 1 or more before.

Emergency physicians or medical officers under their supervision (Table 3) managed 13 of the 14 patients with normal vaginal deliveries. The one exception was when an obstetrician from the private sector came to the ED shortly after the arrival of the patient, at the behest of the husband. The ED team had no objections to his attendance, and he carried out the delivery. As the mother was tiring, he decided to perform a forceps delivery to shorten the second stage of labour. This was successfully achieved without any adverse outcome. All 14 patients had no breech presentation. All the deliveries were full-term in those mothers who knew their antenatal history and the expected dates of delivery. The 6 single mothers who delivered in our

ED were unable to recall the dates of their last menstrual periods, and could only estimate their lengths of pregnancy in months. As such, we could not exactly tell if their pregnancies had been carried to full term. However, only 1 neonate had borderline low birthweight (1540 g), while the other 5 neonates appeared full term from their physical characteristics and had birthweights of >2000 g.

The Apgar scores at 1 and 5 minutes were measured for the neonates (Table 3). Only 1 child (born to a single mother without antenatal care) had a low Apgar score of 3 and 6, but improved with oxygen and suctioning, without any need for resuscitation or intubation. None of the neonates had any birth trauma (such as fractured clavicle or brachial plexus injury) or meconium aspiration. Maternal birth trauma and complications were more common than neonatal birth trauma. The 2 most common maternal problems were perineal tears and retained placenta (Table 3). Five of the 14 patients had perineal tears. Four of these 5 patients had no episiotomies done, and only 1 of the 5 was primiparous. The patient who delivered with the help of forceps had an episiotomy done by her obstetrician. Unfortunately, as this was a retrospective study, we could not ascertain if the perineal tears were simple or complex from the case notes (both in CGH and KKH) or from patient interviews. As for neonatal problems, one child developed hypoglycaemia and polycythemia, while another developed hypoglycaemia, polycythemia and neonatal jaundice, which as far as we can tell was unrelated to the care provided in the ED.

Table 3. Outcomes of Childbirths in the Emergency Department and Complications

S/N	Mother's age/race	Gravidity/parity	Diagnosed pregnancy with antenatal care	Sex of child	Episiotomy	Apgar score (1,5 mins)	Birthweight (g)	Delivery and postpartum complications
1	19/Mal	G3P2	Yes	Female	Not done	9,9	3500	Placenta could not be delivered
2	40/Mal	G4P3	Yes	Female	Not done	9,9	3300	Perineal tear – repaired
3	26/Ind	G4P3	Yes	Female	Not done	9,9	2810	Nil
4	26/Eur	G2P0	Hidden	Female	Not done	6,9	2410	Nil
5	21/Ch	G1P0	Hidden	Female	Not done	9,9	2500	Nil
6	27/Ch	G2P1	Yes	Male	Not done	9,9	2150	Perineal tear – repaired; child had hypoglycaemia, polycythemia
7	27/Ch	G3P2	Yes	Male	Not done	9,9	2850	Perineal tear – repaired
8	18/Ch	G1P0	Hidden	Male	Not done	9,9	3020	Perineal tear – repaired
9	38/Ch	G2P1	Yes	Male	Not done	4,10	2945	Placenta could not be delivered
10	16/Mal	G1P0	Hidden	Male	Yes	3,6	2540	Nil
11	20/Mal	G1P0	Hidden	Female	Not done	9,9	1540	Postpartum hypertension which resolved; low birthweight baby
12	33/Mal	G3P2	Yes	Female	Yes	9,9	2600	Perineal tear – repaired; child had hypoglycaemia, polycythemia, neonatal jaundice
13	15/Mal	G1P0	Hidden	Male	Yes	9,9	2500	Nil
14	31/Ch	G3P2	Yes	Male	Yes	9,10	3300	Forceps delivery by obstetrician; nil complications

Ch: Chinese; Eur: Eurasian; Ind: Indian; Mal: Malay

As a routine, all neonates delivered in the ED were given intramuscular vitamin K injections, and thereafter kept warm and dry. Their mothers were given intramuscular syntometrine 1 ampoule (500 micrograms ergometrine plus 5 units syntocinon). All patients were subsequently transferred to KKH, or to another maternity hospital if they so wished.

## Discussion

CGH has no neonatal or obstetric and gynaecological services; such patients are referred to KKH, about 20 to 30 minutes away by motor transport. The ED of CGH has therefore maintained a constant preparedness for emergency deliveries. In addition to 2 delivery sets and delivery forceps, the department also has neonatal resuscitation equipment available (neonatal-sized endotracheal tubes, laryngoscopes, intravenous catheters and manual resuscitators). While emergency physicians are not required to undergo a rotation in obstetrics and gynaecology during their emergency medicine training, all have experience of performing obstetric deliveries in their undergraduate obstetrics posting. Admittedly, the use of delivery forceps is a skill not often utilised in our practice, although the doctors know the indications for its use and its application. In contrast, all our emergency physicians are required to undergo paediatric advanced life support courses. We do not have cardiotocography available in our ED. Instead, we utilise bedside ultrasonography to look at fetal positioning (especially vital in excluding breech and twin pregnancies), and a hand-held Doptone machine (Smith-Klein instruments) to detect fetal heart sounds. Both these adjuncts can be done without the need for special training. Emergency physicians are in attendance 24 hours of the day, and have the knowledge to carry out neonatal resuscitation and emergency delivery.

Patients in the eastern part of Singapore who call for the Singapore Civil Defence Ambulance Service for labour pains will be sent to KKH for delivery. Therefore, patients who come to our ED with labour pains are those who feel they could not make it in time to their hospitals for delivery, or those who are unaware of, or have been concealing, their pregnancies.

The anxiety that emergency physicians feel in caring for a woman in active labour stems not only from a lack of familiarity with normal deliveries but also the recognition that serious and rarely fatal complications can occur.<sup>1-3</sup> This is especially so in single mothers who have had no antenatal care. Such patients are often primiparous, are unsure of their dates (risk of premature birth), and might have as-yet-undiagnosed gestational disorders that could affect the outcome of the labour (such as hypertensive disorders of pregnancy, gestational diabetes, twin

pregnancies, placenta praevia, intrauterine infections, breech position, etc).

We have had to consider whether to transport the patient in labour to KKH or to deliver the child in our ED. A patient with contractions can still be transported if she has not yet reached the advanced active phase of the first stage of labour (with cervical dilatation of >5 cm). In such a situation, we will call the obstetrician-on-call at KKH to arrange for an urgent admission directly to its delivery suite. A senior doctor will accompany the patient in our ambulance, with appropriate resuscitation and delivery equipment on board. However, this decision can be modified should the patient be multiparous, as labour tends to progress faster in this group. Patients with complete cervical dilatation and effacement, closely spaced (1 in <5 minutes) strong contractions and a strong urge to push are in imminent delivery and will then be managed in our ED. Of the 9 patients (8 of them were primiparous) transported to KKH, all delivered after being admitted to the delivery suite at KKH.

Young single mothers with hidden pregnancies pose a special challenge to the ED team. The risk of encountering a premature neonate is high, as such patients usually have no antenatal care and are unsure of their dates. With such encounters, our policy has always been to prepare for neonatal resuscitation of a premature infant, until proven otherwise. In our series, only 1 probable premature neonate was delivered (suspected based on the low birthweight of 1540 g). Fortunately, no neonatal resuscitation has been needed to date. In addition, such patients are often anxious and emotionally immature. They mostly presented alone, without other family members to provide support. Staff must show extra care, concern and empathy towards these patients, and we have found that a non-judgemental attitude is crucial. It is interesting to note that in our series, the initial triage complaints by the single mothers were “diarrhoea”, “abdominal pain”, or “bleeding per vaginum”, before the examination revealed the true reason for their attendance. Our nurses and doctors had to coach them on breathing and when to push. In contrast, we observed that married mothers with antenatal care were more knowledgeable about their condition and antenatal problems, and were also more mentally prepared to undergo the labour process. It helped that 9 of the married mothers had had previous deliveries, and thus were more knowledgeable about their condition, having previously undergone the labour process. Friends and relatives usually accompanied the latter group of patients.

Many of the patients had arrived in imminent labour and had a strong urge to push, with resulting rapid expulsion of the fetal head. This contributed to the high incidence of perineal tears in our series, observations made in 2 other

similar studies.<sup>4,5</sup> At present, it seems that the safest way to prevent perineal tears is to apply mild counterpressure to the head to prevent rapid expulsion of the head, aiding a traumatic delivery. A useful manoeuvre is to use the left hand to control the fetal chin as the head presents, while the right hand remains on the crown of the head.<sup>6</sup> From the emergency physician's viewpoint, complex perineal tears can be referred promptly to the gynaecologist for expert repair, after packing to achieve haemostasis. They need not be repaired urgently in the ED as, admittedly, most emergency physicians lack the necessary experience in this area of wound repair.

Retained placentas occur in about 2% of deliveries. The retained placenta, like other retained products of conception, has the potential to cause postpartum haemorrhage and endometritis. However, this is not an acute problem for the emergency physician, and like perineal tears, can be transferred promptly to the gynaecologist for further management. This usually consists of manual removal under general anaesthesia or epidural blockade. There is no need to apply vigorous traction on the cord to hasten removal. Instead, this may cause tearing of the cord or uterine inversion. There was failure of spontaneous expulsion of the placenta in 2 out of the 14 deliveries in the ED in our series and these patients were transferred to KKH for further management. No attempts were made to use any manoeuvres in assisting the delivery of the placenta.

## Conclusion

An ED in a non-obstetric hospital should have in place adequate preparations to cater for the occasional unexpected emergency delivery and associated need for neonatal resuscitation. In our series, there was a high proportion of concealed (hidden) and "unaware" pregnancies presenting in labour, with initial triage complaints of "diarrhoea",

"abdominal pain", or "bleeding per vaginum". A patient with contractions can still be transported if the active phase of the first stage of labour has not yet been reached. However, this decision can be modified should the patient be multiparous, as labour tends to progress faster in this group, or if the transport time exceeds an hour. The team must also provide emotional support to the single mother who presents without antenatal care. Vaginal trauma and retained placenta are frequent complications in our experience, but they are not immediately life-threatening and can be managed adequately with prompt referral to a gynaecologist after delivery. A system for urgent consultation and referral should exist between a maternity hospital and the ED when such obstetric services are not available, in order to optimise outcomes in emergency deliveries, especially in the presence of complications.

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