

A photograph of two newborn babies lying on a white surface. The baby on the left is crying with its mouth wide open and eyes squeezed shut. The baby on the right is smiling and looking towards the camera.

Delayed-interval Delivery in Twin Pregnancy

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INTRODUCTION

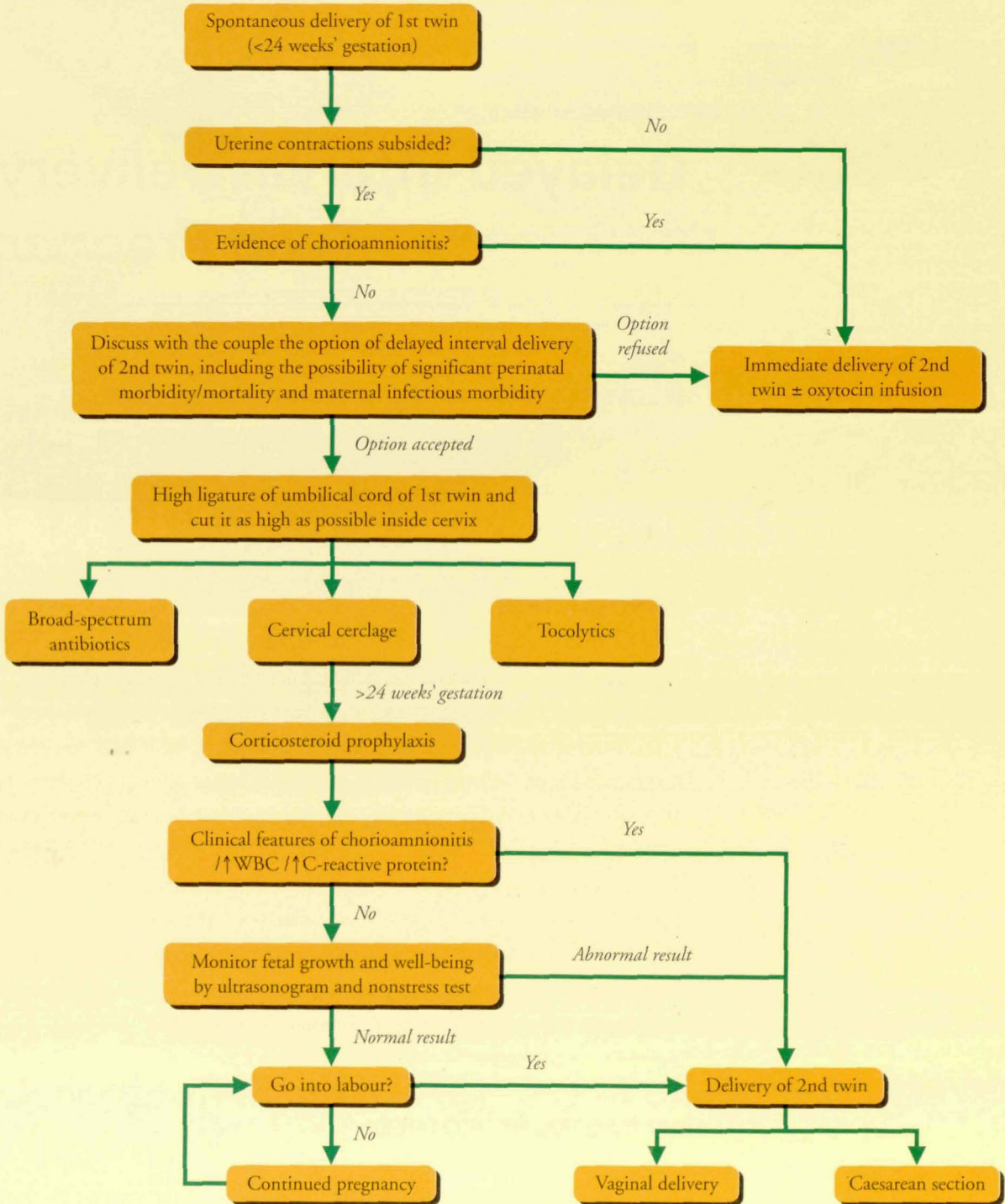
The number of twin pregnancies has increased dramatically as a result of assisted reproduction technology. Delayed interval delivery in twin pregnancy is a rare occurrence (0.14 per 1,000 births or 1% of multiple pregnancies).¹ It refers to the clinical scenario when the first twin has been delivered spontaneously (usually before 24 weeks of gestation), and an attempt is made to delay the delivery of the second twin with the aim of improving the perinatal outcome.

Delayed interval delivery in twin pregnancy was first described by Carson in 1880² and then by Thomsen, almost a hundred years later in 1978.³ Controversies in the management of this clinical scenario exist, which are not going to be solved by randomized controlled trials because of the rarity of this condition. Current literature is composed mainly of isolated case reports and small case series. As a result, reporting bias toward favourable perinatal outcomes is unavoidable.

MANAGEMENT PROTOCOL

There is no single ideal management protocol. The protocol we propose (Figure 1) is similar to that of Frauke et al.⁴ It is necessary to modify the management according to individual circumstances with strong respect for the wish of the couple.

Figure 1. Management algorithm for delayed interval twin delivery.



Patient Selection/Informed Consent

Delayed interval delivery becomes an option when uterine contractions subside after delivery of the first twin, particularly before 24 weeks of gestation when the second twin would not be viable if it is delivered immediately afterwards. After 24 weeks, the rationale for this option becomes less clear-cut as it depends on the level of neonatal intensive care support available and the corresponding survival statistics of extremely preterm babies. Delayed interval delivery is mainly attempted in dichorionic twin pregnancies, the majority of which are assisted reproduction pregnancies. However, this has also been reported in monochorionic twin pregnancies.⁵ There should not be any evidence of chorioamnionitis.

The authors' practice is to discuss with the couple the possible risks of delayed delivery to the mother (infectious morbidity) and to the second twin (significant perinatal morbidity and mortality). The option of immediate delivery of the second twin (by oxytocin infusion to stimulate uterine contractions) would also be offered. Should the couple decide to have delayed interval delivery of the second twin, we would perform high ligation of the umbilical cord of the first twin and cut it as high as possible inside the cervix.

Antibiotics

Prophylactic antibiotics are used because of the risk of chorioamnionitis. Broad-spectrum parenteral antibiotics (e.g. ampicillin and metronidazole) are given in the first 48 hours followed by their oral counterparts to complete a 1-week course. Some authors recommend a continuous regimen until the second twin is delivered.^{6,7} The choice of antibiotics will be further guided by the culture and sensitivity results of high vaginal and endocervical swabs.

Tocolytics

The use of tocolytic therapy with a variety of drugs (β_2 -agonists, calcium inhibitors, magnesium sulphate, anti-inflammatory drugs, antispasmodics) via oral or

parenteral routes, either alone or in multiple combinations for a variable period, has been reported.^{6,9} Oral nifedipine is the authors' first choice. However, there is no data to support that tocolytics can prolong the delivery interval or improve the perinatal outcome.

Cerclage

The placement of a cervical cerclage is the most controversial treatment in delayed interval delivery.^{6,9} Those who advocate cerclage believe that it would minimize the exposure of fetal membranes to vaginal bacteria and acidity. It can also facilitate patient mobilization. The authors belong to this school of thought. In addition to the McDonald suture, some clinicians would perform the Wurm sutures if the distal portion of the cervix is patulous.⁶ On the other hand, some believe that cerclage would increase the risk of chorioamnionitis and premature rupture of membranes. In a recent review of a seven-case series by Zhang et al,¹⁰ cerclage after delivery of the first twin was associated with a longer delivery interval without increasing the risk of intrauterine infection.

Steroids

After 24 weeks' gestation, the authors would give corticosteroid prophylaxis with intramuscular betamethasone to reduce the risk of respiratory distress syndrome of the second twin in view of the very high risk of preterm delivery. Most of the reported cases^{6,9} were managed on an inpatient basis with the advantage of closer monitoring of chorioamnionitis and fetal well-being. However, inpatient management has not been



The couple should be aware of the potential perinatal morbidity and mortality as well as the risk of maternal infection in order to make an informed decision.

Table 1. Perinatal outcome of delayed interval twin delivery

Study (no. of patients)	Gestation at delivery (weeks) Mean \pm SD		Birth weight (g) Mean \pm SD		Delivery interval (days) Mean \pm SD (range)	Survival rate		
	1st twin	2nd twin	1st twin	2nd twin		1st twin	2nd twin	Overall
Abboud et al, 1997; ⁸ Platt & Rosa, 1999 ⁹ (n = 48)	24	31	475	1,240	45 (3 to 143)	6%	74%	34%
Farkouh et al, 2000 ⁶ (n = 20)	23	28	-	-	36 (3 to 123)	16%	63%	40%
Fayad et al, 2003 ⁷ (n = 28)	21 \pm 6	28 \pm 5	497 \pm 293	1,217 \pm 602	47 \pm 36 (3 to 140)	7%	79%	43%

Table 2. The use of antibiotics, tocolytics, cerclage and inpatient management

Study (no. of patients)	Antibiotics	Tocolytics	Cerclage	Inpatient management
Abboud et al, 1997; ⁸ Platt & Rosa, 1999 ⁹ (n = 48)	84%	70%	59%	70%
Farkouh et al, 2000 ⁶ (n = 20)	100%	100%	100%	100% (first 7 days)
Fayad et al, 2003 ⁷ (n = 28)	100%	82%	80%	93%

shown to prolong the delivery interval.⁷ The authors' department has adopted a more flexible inpatient policy, allowing home leave during the weekends and public holidays.

Postoperative Follow-up

Any clinical features of chorioamnionitis are closely looked for during follow-up. Full blood count and C-reactive protein are monitored daily in the first week, and if stable, on alternate days and then weekly. Delivery of the second twin should be considered when there is evidence of chorioamnionitis. On the other hand, a transient elevation of white blood cell count (but not C-reactive protein) after corticosteroid prophylaxis¹¹ should not be taken as evidence of chorioamnionitis. Fetal growth and well-being are assessed by weekly ultrasound examination and regular nonstress test, the frequency of which depends on the gestational age and level of clinical

suspicion. We would deliver the second twin if there is evidence of chorioamnionitis or fetal compromise, or if the woman goes into spontaneous labour again despite the use of tocolytics. The mode of delivery would depend on the fetal well-being, gestational age and fetal presentation at the time of delivery. The cerclage will be removed if vaginal delivery is aimed for, otherwise it is going to be removed after caesarean section.

PERINATAL OUTCOME

In order to have a clearer idea of the course and outcome of the cases managed with delayed interval twin delivery, we have reviewed and summarized in Table 1 data on gestation at delivery, birth weight, delivery interval and survival rate of the first and second twins of 96 cases from the literature. Forty-eight cases belonged to isolated case reports or small case series,^{8,9} 20 were reported from a single maternal fetal medicine centre,⁶ and 28 were reported from a multicentre retrospective study.⁷ The figures are very similar despite the different nature of these studies with their own reporting biases. Table 1 thus serves as a reference guide for counselling of candidate couples for delayed interval twin delivery. Table 2 shows the statistics of the use of antibiotics, tocolytics, cerclage and inpatient management in these studies. A good prognostic factor for the survival of the second twin is the delivery interval,⁹ which varied widely from 3 to 143 days. (Table 1) The

delivery interval varied inversely with the gestational age at delivery of the first twin.⁷ In other words, the earlier the delivery of the first twin, the longer the delivery interval and the better the outcome for the second twin. The delivery interval also tended to be longer after expulsion of the first twin's placenta, cerclage, premature rupture of membranes of the second twin and antenatal corticosteroid therapy.⁷

Compared with survival figures, there is much less data from the literature on the perinatal morbidity of the surviving twins. Few fetal complications had been reported, which is probably the result of reporting bias toward favourable outcomes in isolated case reports or small case series. However, in a recent paper from Livingston et al who had studied the maternal and fetal morbidities in 14 cases (nine pairs of twins and five sets of triplets) of delayed interval delivery in multifetal pregnancy from two tertiary care centres over 12 years, there were 19 retained fetuses, seven of whom survived, and six of these seven survivors had major sequelae including grade 3 or 4 intraventricular haemorrhage, stage III retinopathy of prematurity, and bronchopulmonary dysplasia.¹ Improvement in neonatal intensive care over time will certainly have an impact on the perinatal outcome. Nevertheless, it is important to inform the couple about these potential long-term paediatric complications before the attempt of delayed interval delivery. They should also be aware that there is currently very scant data on long-term follow-up of this group of surviving children.

MATERNAL OUTCOME

Adverse maternal outcome of delayed interval delivery refers mainly to infectious morbidity. In Farkouh et al's case series from a single maternal fetal medicine centre, one-third of mothers had postpartum infectious morbidity (endometritis, septic pelvic thrombophlebitis) requiring antibiotic therapy.⁶ In Livingston et al's series of 14 cases with delayed interval delivery,

maternal morbidity included two placental abruptions and eight cases of infectious morbidity, one of which developed septic shock.¹ No maternal death had been reported.

ETHICAL ISSUES

Delayed interval delivery of the second twin may result in the delivery of a child with severe morbidity and handicap instead of delivering a previable fetus who will die at delivery.¹² This possibility should be discussed when counselling the couple. On the other hand, as many of them are subfertile couples who have received assisted reproduction treatment, this may well be their only chance of having a child in their family. The decision to go ahead with delayed interval delivery should, therefore, be individualized.

Practice Points

- Delayed interval delivery in twin pregnancy is a rare occurrence.
- Delaying the delivery with the help of antibiotics, cerclage and tocolytics can achieve a survival rate of 70% for the second twin.
- The couple should be aware of the potential perinatal morbidity/mortality and maternal infectious morbidity.
- The management decisions should be individualized.

CONCLUSION

An ideal candidate for delayed interval twin delivery is one in whom delivery of the first twin occurs at an early gestation (<24 weeks, before viability) and uterine contractions subside afterwards with no evidence of chorioamnionitis. Delaying the delivery of the second twin with the help of antibiotics, cerclage and tocolytics can achieve a survival rate of 70%. This may be the only chance for a subfertile couple to have a child in their family after many years of assisted reproduction treatment. At the same time, it is the clinician's

responsibility to ensure their awareness of the potential perinatal morbidity and mortality, as well as the risk of maternal infectious morbidity, so that they can make an informed and individualized decision before proceeding with delayed interval twin delivery.

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REFERENCES

- Livingston JC, Livingston LW, Ramsey R, Sibai BM. Second-trimester asynchronous multifetal delivery results in poor perinatal outcome. *Obstet Gynecol* 2004;103:77-81.
- Carson JL. Twins born with an interval of 44 days. *Br Med J* 1980;1:242.
- Thomsen RJ. Delayed interval delivery of a twin pregnancy. *Obstet Gynecol* 1978;52(Suppl):S 37-S40.
- Frauke MA, Van der Straeten, De Ketelaere K, Temmerman M. Delayed interval delivery in multiple pregnancies. *Eur J Obstet Gynecol Reprod Biol* 2001;99:85-89.
- Beinder E, Lang N. Delayed interval delivery in a twin pregnancy with monochorionic placenta. *Am J Obstet Gynecol* 1997;176:254.
- Farkouh LJ, Sabin ED, Heyborne KD, Lindsay LG, Porreco RP. Delayed-interval delivery: extended series from a single maternal-fetal medicine practice. *Am J Obstet Gynecol* 2000;183:1499-1503.
- Fayad S, Bongain A, Holthfeld P, et al. Delayed delivery of second twin: a multicentre study of 35 cases. *Eur J Obstet Gynecol Reprod Biol* 2003;109:16-20.
- Abboud P, Gallais A, Janky E. Intentional delayed delivery in twin pregnancy. Two additional cases and literature review. *Eur J Obstet Gynecol Reprod Biol* 1997;75:139-143.
- Platt JS, Rosa C. Delayed interval delivery in multiple gestations. *Obstet Gynecol Surv* 1999;54:343-348.
- Zhang J, Johnson CD, Hoffman M. Cervical cerclage in delayed interval delivery in a multifetal pregnancy: a review of seven case series. *Eur J Obstet Gynecol Reprod Biol* 2003;108:126-130.
- Vaisbuch E, Levy R, Hagay Z. The effect of betamethasone administration to pregnant women on maternal serum indicators of infection. *J Perinat Med* 2002;30:287-291.
- Mercer BM, Crocker LG, Pierce F, Sibai BM. Clinical characteristics and outcome of twin gestation complicated by preterm premature rupture of the membranes. *Am J Obstet Gynecol* 1993;168:1467-1473.

PICTORIAL MEDICINE

CYSTIC HYGROMAS

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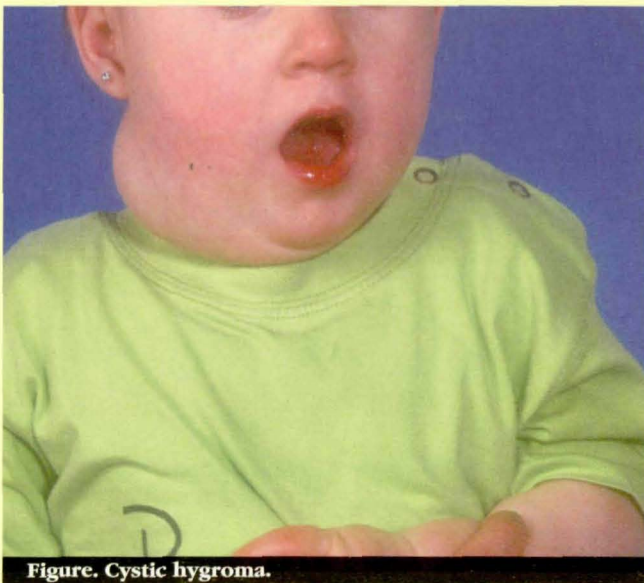


Figure. Cystic hygroma.

Cystic hygromas are congenital lymphatic abnormalities, with an incidence of 1 per 12,000 population per year. Histologically, they are multiloculated hamartomatous malformations, lined by endothelial cells and containing lymph. About 60% are congenital

or are diagnosed antenatally, with the remainder evident by 2 years of age.

Typically, a soft, non-tender swelling is present in the posterior triangle of the neck. (Figure) Cystic hygromas transilluminate due to the presence of clear lymphatic fluid. Severe cases involve the whole side of the neck, traversing several tissue planes. Oropharyngeal, oesophageal and tracheal involvement may result in dysphagia and respiratory obstruction.

Surgery must involve excision of all affected tissue to avoid recurrence, but this is notoriously difficult. Injuries to the brachial plexus, facial nerve, sympathetic trunk and local vascular structures are well documented. Sclerosing agents (e.g. tetracycline, fibrin glue) have been used with some success, as have agents containing inactivated *Streptococcus pyogenes*.

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