

Multiple Pregnancies in KK Women's and Children's Hospital

KH Tan, KM Kwok, X Wei

ABSTRACT

Introduction: The rising trend of multiple pregnancy over the recent years is observed worldwide, but few local studies have been done thus far on the characteristics of these pregnancies.

Methods: We reviewed case notes of all live multiple pregnancies delivered in the largest maternity hospital in Singapore in 2007 and examined data on type of conception, antenatal complications, reasons for admission leading to delivery, indications for delivery, type of delivery and postnatal outcomes.

Results: Of 148 multiple pregnancy cases, 67% conceived naturally. ART contributed to 100% of the 7 triplets, 45.1% of the 91 dichorionic twins but only 2% of the 50 monochorionic twins. Intrauterine growth restriction and foetal complications were significantly more prevalent in monochorionic than dichorionic twins (28.0% vs 9.9% and 28.0% vs 11.0%, respectively). Postpartum complications were rare and postnatal outcomes were comparable between twins and triplets.

Discussion: ART plays an important role in the rising incidence of multiple pregnancy in Singapore. The outcome of this work may serve as a basis for comparison in future studies.

INTRODUCTION

There has been a significant recent increase in the incidence of multiple pregnancy in many countries worldwide [1], and this is mainly attributed to two factors: more prevalent use of assisted reproductive techniques and a rise in maternal age [1-2].

Following ART procedures, dizygotic twin occurrence is higher as a result of ovarian stimulation protocols and multiple embryo transfers. The reasons for

increased monozygotic twinning frequency associated with ART techniques are less well defined, but a review of larger studies have suggested that the most significant contributors are ovarian stimulation and extended embryo culture coupled with blastocyst transfer [3]. In a recent meta-analysis in UK, the risk of monozygotic twins in assisted conception has been reported to be 2.25 times higher than that in natural conceptions [4].

Multiple pregnancy is known to be associated with a higher risk of complications, both maternal and foetal, as compared to singleton pregnancies. Foetal complications may include restricted growth and preterm deliveries (with its related complications of prematurity), as well as increased incidence of antenatal and perinatal loss, while maternal complications include hyperemesis gravidarum, pregnancy-induced hypertension or pre-eclampsia (PE) [3].

In this study we reviewed data on multiple-gestation pregnancies from the KK Women's and Children's Hospital (KKH) during year 2007. Of particular interest

AUTHORS: Kok Hian Tan, Xing Wei and Kah Meng Kwok
Division of Obstetrics and Gynaecology,
KK Women's and Children's Hospital

CORRESPONDING AUTHOR:
Assoc Prof Kok Hian TAN
Division of Obstetrics and Gynaecology
KK Women's and Children's Hospital
100 Bukit Timah Road
Singapore 229899
Phone: +65 6394 1323

is the role of assisted conception in the increasing incidence of multiple gestation. It is hoped that this study could serve as an audit for antenatal complications and postnatal outcomes for these pregnancies, and as a basis for comparison in future studies, as well as a valuable aid in pre-conception counselling for couples opting for assisted conception locally.

METHODS

Medical records of all mothers with live multiple gestations delivered in KKH in 2007 were retrieved from Department of Document Management Services of the Hospital.

Patient data were collected on basic demographics, past medical history, past obstetric history, details of conception, antenatal history, peripartum details and postnatal outcome. Stillbirths of less than 28 weeks gestation and foetal (abortion) deaths of less than 24 weeks gestation were excluded. Results were presented in the form of number of cases as well as percentages out of the respective groups. A two-sample z test was applied to compare the proportion between two groups. A p value < 0.05 was considered statistically significant.

RESULTS

In the year 2007, 148 multiple-gestation pregnancies were delivered in KKH, including 141 twins and 7 triplets, with average gestational ages at delivery of 34.6 and 33.6 weeks respectively (Table 1). In terms of chorionicity, there were 50 monochorionic (MC) and 89 dichorionic (DC) twins, and 2 dichorionic and 5 trichorionic triplet pregnancies. In addition, there were 2 trichorionic triplet cases in which one triplet died during pregnancy, and they were subsequently analysed as dichorionic twins.

Of the 148 mothers, more than half conceived naturally (99/148, 66.9%). The remaining 49 or 33.1% resorted to ART including *in vitro* fertilisation (IVF) with or without intra-cytoplasmic sperm injection (ICSI), or super-ovulation and intrauterine insemination (SO-IUI). It was noted that 98% of the MC twins were from natural conception, as compared to 54.9% of the DC twins and 0% of the triplets (Table 2).

Common antenatal complications during multiple gestation pregnancy included pre-eclampsia, hypertension, gestational diabetes mellitus (GDM) and intrauterine growth restrictions (IUGR). In particular, IUGR rate was significantly higher in MC twins than

TABLE 1. Maternal Characteristics and Chorionicity

	Twin			Triplet
	MC	DC	Overall	
<i>n</i> (%)	50	91	141	7
Demographics				
Average maternal age	29.5	31.5	30.8	33.3
Average gestational age				
– at first visit	14.5	11.1	12.3	13.4
– at delivery	33.6	35.3	34.6	33.6
History of multiple gestation			4 (2.8)	
Chorionicity				
Monochorionic			50 (35.5)	
Dichorionic			89 (63.1)	2 (28.4)
Trichorionic			2 (1.4)	5 (71.6)

Numbers in () indicate percentages

TABLE 2. Antenatal and Labour Characteristics

	Twin			Triplet
	MC	DC	Overall	
<i>n</i> (%)	50	91	141	7
Type of conception				
Natural	49 (98.0)	50 (54.9)	99 (70.2)	
IVF		36 (39.6)	36 (25.5)	5 (71.6)
IVF + ICSI		2 (2.2)	2 (1.4)	2 (28.4)
SO-IUI	1 (2.0)	3 (3.3)	4 (2.8)	
Antenatal complications				
Pre-eclampsia / pregnancy induced hypertension	6 (12.0)	9 (9.9)	15 (10.6)	3 (42.9)
Gestational diabetes mellitus	5 (10.0)	10 (11.0)	15 (10.6)	3 (42.9)
Intrauterine growth restriction	14 (28.0)*	9 (9.9)	23 (16.3)	1 (14.3)
Twin-to-twin transfusion syndrome	4 (8.0)		4 (2.8)	
Reason for admission leading to delivery				
Elective LSCS	14 (28.0)	30 (33.0)	44 (31.2)	4 (57.1)
Preterm labour / preterm prelabour rupture of membrane	14 (28.0)	28 (30.8)	42 (29.8)	2 (28.6)
Monitoring of antenatal complications	13 (26.0)*	6 (6.6)	19 (13.5)	1 (14.3)
Labour / induction of labour	8 (16.0)	25 (27.5)	33 (23.4)	
Others	1 (2.0)	2 (2.2)	3** (2.1)	
Indications for delivery				
NA (Normal vaginal delivery)	8 (16.0)	15 (16.5)	23 (16.3)	
Presentation (non-cephalic)	1 (2.0)	13 (14.3)	14 (9.9)	1 (14.3)
Previous LSCS	2 (4.0)	1 (1.1)	3 (2.1)	
Maternal complications	2 (4.0)	6 (6.6)	8 (5.7)	1 (14.3)
Foetal complications	14 (28.0)*	10 (11.0)	24 (17.0)	
Patient's choice	13 (26.0)	21 (23.1)	34 (24.1)	3 (42.9)
Failure to progress during labour	2 (4.0)	12 (13.2)	14 (9.9)	
Failure of inhibition	8 (16.0)	13 (14.3)	21 (14.9)	2 (28.6)

* $p < 0.05$ when compared against DC group

** Others: 1 antepartum haemorrhage, 1 completed birth before arrival, 1 intrauterine death

DC twins. Four twin-to-twin transfusion syndrome cases were observed, exclusively in the MC group. The most common reason for admission leading to delivery was elective lower segment Caesarean section (LSCS) for both twins and triplets (Table 2).

With regard to type of delivery, all of the triplets underwent LSCS, with 3 elective and 4 emergency cases. Of the twins, 64 (22.7%) were delivered vaginally and 218 (77.3%) via LSCS. The average birth weight was, as expected, slightly higher for the twins (2126 g) than triplets (1772 g). However, the mean Apgar scores of the twins and triplets were comparable (Table 3).

Postpartum complications were rare and only seen in 4 cases (0.03%) of all twin pregnancies. One mother had depression with psychosis that warranted psychiatric consult, and one other had post-natal blues which spontaneously abated. The third had

pre-existing dengue prior to delivery, and was further complicated by anaemia and postpartum thrombocytopenia, and the last one had postpartum haemorrhage, which was controlled with conservative measures. In addition, there were only 2 delays in expected maternal discharge: one stayed for blood pressure monitoring while the other mother with pre-existing dengue stayed for correction and stabilization of her anaemia and thrombocytopenia. For the triplet group, 1 mother had persistently high blood pressure after delivery (which subsequently became under control with anti-hypertensives), and there were no delays in expected maternal discharges.

DISCUSSION

As has been observed elsewhere in the world, the overall incidence of multiple pregnancy in KKH was on the rise, from 1.16% of the total deliveries in 2000 to 1.36% in 2007 (unpublished data). In 2007 alone, the number of live multiple pregnancies (148)

TABLE 3. Delivery and Postnatal Characteristics

	Twin			Triplets
	MC	DC	Overall	
<i>n (%)</i>	100	182	282	21
Type of delivery (babies)				
LSCS	81 (81.0)	137 (75.3)	218 (77.3)	21 (100.0)
Emergency LSCS	63 (63.0)	81 (44.5)	144 (51.1)	12 (57.1)
Elective LSCS	18 (18.0)	56 (30.8)	74 (26.2)	9 (42.9)
Normal vaginal delivery	19 (19.0)	45 (24.7)	64 (22.7)	
– unassisted	17 (17.0)	32 (17.6)	49 (17.4)	
– vacuum assisted		8 (4.4)	8 (2.8)	
– forceps assisted	2 (2.0)	5 (2.7)	7 (2.5)	
Postnatal outcome				
Average birthweight	1914.6	2264.0	2140.1	1771.9
Mean Apgar at 1 min	8.31	8.58	8.29	8.57
Mean Apgar at 5 min	8.62	8.89	8.65	8.95

contributed to 1.2% of the total live births (12,259) in KKH, but 6.2% of the total LSCS performed (3,509) in the same year. This study adds to the existing literature and confirms the hypothesis that ovulation-stimulation and multiple embryo transfer techniques used in ART are at least partly responsible for the rising incidence of multichorionic pregnancies.

The overall rates of PE and GDM in multiple gestations (both 12.2%) are significantly more than the average 3.6% of PE (in all pregnancies in 2006) [5] and 4.2% of GDM (in pregnancies in 1996) [6]. In addition, specific complications relating only to multiple gestations, namely twin-to-twin transfusion syndrome (TTTS) and its related sequela, intra-uterine growth restriction (IUGR), also feature in reasons for LSCS delivery. Thus, multiple gestations pose a higher risk of antenatal and foetal complications, in particular, PE, GDM, IUGR and TTTS which significantly contributed to an increase in LSCS rates (and its attendant complications with relation to normal vaginal delivery). The average birth weight (1772 g for triplets, 2126 g for twins) decreased with higher order of pregnancy, presumably due to both increased rates of premature delivery and increased incidence of IUGR (16.3% vs 14.3%). However, the immediate post-natal outcome as estimated by the Apgar scores of more than 8 at first and fifth minutes appears comparable to that of singletons. This is likely due to excellent antenatal and

perinatal care in KK hospital and appropriate choice of delivery timing. Maternal postpartum complications are also rare in this study, and almost all mothers are discharged as planned (i.e. 1 day after normal vaginal delivery, POD 3 post-LSCS).

The data generated in this study can be applied to pre-conception counselling of mothers going for ART, since ART clearly plays a significant role in generating multiple gestation locally, with higher order pregnancy being much more likely to be due to assisted conception (100% of all triplets versus 29.8% in twins). With multiple gestations, although the rate of antenatal complications such as PE and GDM is increased, the immediate post-natal outcome for both mothers and babies may not necessarily be compromised.

In the long term, the study will provide a basis for comparing with other countries with regards to outcome of multiple gestations. These data fills in the missing gap in information relating to the characteristics and outcomes of local multiple-gestation pregnancies, as there is a paucity of studies in this area. Our study could serve as a comparison between the public and private sectors with regards to outcome of multiple gestation: it can act as a reference for studies investigating the outcome of multiple gestation in the private sector.

REFERENCES

1. Imaizumi, Y., A comparative study of twinning and triplet rates in 17 countries, 1972-1996. *Acta Genet Med Gemellol (Roma)*, 1998. 47(2): p. 101-14.
2. Chia, K.S., et al., Twin births in Singapore: a population based study using the National Birth Registry. *Ann Acad Med Singapore*, 2004. 33(2): p. 195-9.
3. Aston, K.I., C.M. Peterson, and D.T. Carrell, Monozygotic twinning associated with assisted reproductive technologies: a review. *Reproduction*, 2008. 136(4): p. 377-86.
4. Vitthala, S., et al., The risk of monozygotic twins after assisted reproductive technology: a systematic review and meta-analysis. *Hum Reprod Update*, 2009. 15(1): p. 45-55.
5. Tan, K.H., K. Kwek, and G.S. Yeo, Epidemiology of pre-eclampsia and eclampsia at the KK Women's and Children's Hospital, Singapore. *Singapore Med J*, 2006. 47(1): p. 48-53.
6. Ray, R., et al., Gestational diabetes in Singaporean women: use of the glucose challenge test as a screening test and identification of high risk factors. *Ann Acad Med Singapore*, 1996. 25(4): p. 504-8.