

## OBSTETRICS

# The effectiveness of multifetal pregnancy reduction in trichorionic triplet gestation

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**OBJECTIVE:** The objective of the study was to assess in trichorionic triplet pregnancies the effectiveness of elective reduction to twins.

**STUDY DESIGN:** This was a nationwide retrospective cohort study. We compared the time to delivery and perinatal mortality in trichorionic triplet pregnancies electively reduced to twins with ongoing trichorionic triplets and primary dichorionic twins.

**RESULTS:** We identified 86 women with reduced trichorionic triplet pregnancies, 44 with ongoing trichorionic triplets, and 824 with primary twins. Reduced triplets had a median gestational age at delivery of 36.1 weeks (interquartile range [IQR], 33.3–37.5 weeks) vs 33.3 (IQR, 28.1–35.2) weeks for ongoing triplets and 37.1 (IQR, 35.3–38.1) weeks for primary twins ( $P < .001$ ). The total number of surviving children in the reduced group was 155 (90%) vs 114 (86%)

in the ongoing triplet group. After reduction, 75 of women (87%) had all their fetuses surviving, compared with 36 (82%) (relative risk [RR], 1.3; 95% confidence interval [CI], 0.72–2.3) for ongoing triplets and 770 (93%) (RR, 0.91; 95% CI, 0.82–1) for primary twins. There were 6 women without any surviving children (7%) after reduction vs 5 (11.4%) (RR, 0.81; 95% CI, 0.47–1.4) among women with ongoing triplets and 32 (3.9%) (RR, 1.7; 95% CI, 0.8–3.7) in women with primary twins.

**CONCLUSION:** In women with a triplet pregnancy, fetal reduction increases gestational age at birth with 3 weeks as compared with ongoing triplets. However, there the impact on neonatal survival is limited.

**Key words:** multiple pregnancy, multifetal pregnancy reduction, pregnancy outcome

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Over the past 3 decades, the incidence of triplet and higher-order multiple gestations has increased from 37 per 100,000 births in 1980 to 153 per 100,000 births in 2009 in the United States,<sup>1,2</sup> mainly because of the use of

assisted reproductive techniques (ART). In the United States, 35% of pregnancies conceived by ART result in a multiple pregnancy<sup>2,3</sup> vs 22% in Europe.<sup>4</sup>

Women with a triplet pregnancy are at an increased risk of neonatal morbidity

and mortality compared with women with a twin or singleton pregnancy, mainly because of an increased risk of preterm birth.<sup>5,6</sup> Preterm delivery prior to 37 weeks of gestation occurs in 5–9% of women with a singleton pregnancy, 60% of women with twins, and more than 90% of those with triplets.<sup>7–10</sup>

Compared with women with a twin gestation, those with triplets have a significantly increased risk of maternal morbidity such as gestational diabetes, hypertensive disorders, cesarean delivery, and excessive hemorrhage.<sup>3</sup> To decrease the risks associated with triplets and high-order multiple pregnancies, multifetal pregnancy reduction (MFPR) has been performed since the mid-1980s,<sup>11,12</sup> and several approaches have been described.<sup>13,14</sup> The most frequently applied method is through ultrasound-guided transabdominal injection of potassium chloride into the fetal heart or chest cavity.<sup>15</sup>

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There is ample evidence to support pregnancy reduction in gestations involving 4 or more fetuses to the final number of 2 fetuses because twin pregnancies are considered to have a relatively good outcome.<sup>10,16</sup> However, in the event of a triplet pregnancy, there remains debate whether multifetal pregnancy reduction improves the obstetric outcome of triplets reduced to twins.<sup>17</sup>

We studied the effectiveness of fetal reduction in women with a triplet pregnancy as compared with ongoing triplet pregnancies in terms of gestational age at delivery, perinatal death, and neonatal birthweight of triplets reduced to twins.

## MATERIALS AND METHODS

In this retrospective study, we included all women with a triplet pregnancy undergoing fetal reduction to a twin pregnancy in The Netherlands over the period 2000-2010. Data for 2011 were available from 2 centers as well. The procedure was performed transabdominally after local anesthetic by using a 20G or 22G needle and injecting potassium chloride intracardially or intrathoracically. All procedures were performed between 10<sup>0/7</sup> and 15<sup>6/7</sup> weeks' gestation.

Women were identified by searching the ultrasound, obstetric, and fetal databases in all 10 fetal medicine units performing multifetal pregnancy reductions. The study was limited to trichorionic triplets only. The cases in which fetal reduction was performed because of a congenitally abnormal fetus were not included in the study.

The course of pregnancy in women with a reduced triplet was compared with the outcome in women with an ongoing trichorionic triplet pregnancy and with those with a primary dichorionic twin pregnancy. Data regarding ongoing triplet pregnancies were collected from ultrasound and obstetric databases in 2 tertiary (Academic Medical Centre Amsterdam and VU Medical Centre Amsterdam) and 9 secondary hospitals (Onze Lieve Vrouwe Gasthuis Amsterdam, Zaans Medisch Centrum Zaandam, Spaarne Ziekenhuis Hoofddorp, Kennemer Gasthuis Haarlem, Rode Kruis Ziekenhuis Beverwijk, Medisch Centrum

Alkmaar, Gemini Ziekenhuis Den Helder, Flevo Ziekenhuis Almere, and Ter Gooi Ziekenhuis Blaricum). Both of the tertiary hospitals service a large geographical area in the Dutch provinces of Noord-Holland and Flevoland, including all 9 of the previously mentioned secondary hospitals.

All trichorionic triplet pregnancies in the period of 2000–2012 with at least 1 ultrasound performed between 8<sup>0/7</sup> and 14<sup>6/7</sup> weeks' gestation in which 3 living fetuses were identified and fetal reduction was not performed were included in the control group of ongoing triplet pregnancies. For our control group, we included only women with a known date of delivery.

Data regarding original dichorionic twin pregnancies (primary twins) were collected from 1 tertiary (Academic Medical Centre, Amsterdam) and 1 secondary hospital (Onze Lieve Vrouwe Gasthuis, Amsterdam) using a similar selection procedure as described for the triplet control group but obviously was limited to women with 2 living fetuses at inclusion. When women had 2 or more twin pregnancies in the study period, we used the data of the first twin pregnancy only.

Data were collected retrospectively by reviewing maternal and, where appropriate, neonatal and pediatric medical records. Maternal and fetal characteristics, including demographic data, gestational age at the time of reduction (pregnancy dating was based on early ultrasound measurements), ultrasound findings including fetal measurements, chorionicity, and pregnancy outcome were collected.

Chorionicity was determined at the first-trimester ultrasound scan or at the postdelivery histological analysis by a pathologist. Operator and procedure characteristics were also collected including the number of operators and the number of procedures per operator.

Pregnancy outcome was based on the gestational age at delivery, the neonatal birthweight, and the perinatal death. All cases of fetal demise were defined as intrauterine fetal death. Perinatal death was defined as intrauterine fetal death, demise during delivery, or demise in the

first 7 days after delivery. Neonatal and pediatric information included gestational age at delivery, birthweight, and sex.

## Statistical analysis

The outcome of the 3 groups (triplets reduced to twins, ongoing triplets, and primary twins) was compared in terms of gestational age at delivery, delivery less than 24 weeks, delivery less than 32 weeks, neonatal birthweight, and number of perinatal deaths.

We constructed a Kaplan-Meier curve to analyze the time to delivery in each group. Because gestational age at delivery was not normally distributed, we compared the median between the groups with the Kruskal-Wallis test. Neonatal birthweight was distributed normally, and therefore, we compared the mean birthweights between the groups with the 1-way analysis of variance test. A  $\chi^2$  test was used to compare the number of deliveries before 24 and 32 weeks and the number of perinatal deaths among the 3 study groups.

For perinatal mortality, we compared the absolute number of fetal deaths, the number of women who had at least 1 surviving child, the number of women who had at least 1 perinatal death, and the number of women who had all their children or no children surviving. Moreover, we compared the number of mothers who had at least 2 surviving children and the number who had at least 2 surviving children after 32 and 37 weeks' gestation.

The statistical analysis was performed using SPSS 20 (SPSS Inc, Chicago, IL).

## RESULTS

We identified 103 women with a triplet pregnancy who underwent fetal reduction to a twin pregnancy. We excluded 17 women for several reasons: monochorionicity (4 patients), unknown chorionicity (6 patients), congenital anomaly as an indication for reduction (4 patients), ectopic pregnancy as an indication for reduction (1 patient), and loss to follow-up (2 patients), leaving 86 women who met all inclusion criteria. Among the 2 cases that were lost to follow-up, 1 of these women had come to The

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