Multifetal pregnancy reduction (MFPR) appears to be an efficacious method for improving the perinatal outcome of 'high order' multifetal gestations. The present study was undertaken to evaluate pregnancy outcomes after MFPR to twins in comparison with spontaneously conceived twins.

In all, 10 patients with quadruplet gestations (group 1) and 30 patients with triplet gestations (group 2), who underwent MFPR to twins, were prospectively enrolled. Pregnancy complications, gestational age at delivery, mode of delivery and birthweights were compared with 30 consecutive spontaneous twin gestations (group 3) matched by maternal age and parity. Mean gestational age at delivery and birthweights were significantly lower in group 1, compared with groups 2 and 3 (33.2, 35.9, 36.9 weeks, and 1843, 2209, 2361 g respectively).

Introduction

High order multifetal pregnancies (three or more fetuses) are an iatrogenic complication of ovulation induction and assisted reproductive techniques. The obstetric outcome of these pregnancies, especially quadruplets and higher orders, is significantly worse than that of singleton or even twin gestations. Multifetal pregnancy reduction (MFPR) appears to be an efficacious method for improving the perinatal outcome of these pregnancies (Evans et al., 1994).

Most physicians suggest reduction to twins, except for cases in which the mother is at increased obstetric, medical or psychological risk of carrying twins. However, it is questionable whether the obstetric outcomes of twins after reduction are similar to those of non-reduced twin gestations. The present study was undertaken to evaluate pregnancy outcomes after MFPR to twins, in comparison with spontaneously conceived twins.

Materials and methods

The study included 40 consecutive patients with high order, multifetal gestations who underwent MFPR to twins and delivered beyond 25 weeks gestation. All pregnancies resulted from ovulation induction treatment or assisted reproductive treatment. These included, before reduction: 10 quadruplet gestations (group 1) and 30 triplets (group 2). All pregnancies were reduced to twins at ~10 weeks of gestation by transvaginal, ultrasound-guided, intra-embryonic injection of 0.9% NaCl solution. Data from these pregnancies were collected prospectively at the high-risk pregnancy clinic.

Pregnancy outcomes were compared with 30 consecutive spontaneous dizygotic twin gestations (group 3), matched by maternal age and parity. Zygosity was determined by sex discordance or placental morphology. Outcome measurements included: pregnancy complications [premature contractions (PMC), premature rupture of membranes (PROM), pregnancy-induced hypertension (PIH)], gestational diabetes mellitus (GDM) and discordancy > 20%, gestational age at delivery, mode of delivery and birthweights.

Results were analysed statistically by $\chi^2$ test, Student's $t$-test and one-way analysis of variance (ANOVA). Values of $P < 0.05$ were considered significant.

Results

Analysis of age and gravidity demonstrated no differences among the three groups. The mean maternal age was 31.5 ± 4.2 years (group 1), 31.8 ± 4.6 (group 2) and 30.9 ± 3.9 (group 3). Nulliparous patients represented approximately 60% of each group.

Main pregnancy outcomes are depicted in Table I. Mean gestation age at delivery and mean birthweight were significantly lower in group 1, compared with groups 2 and 3 ($P < 0.05$). There was no statistical significance between groups 2 and 3, although group 2 patients delivered 1 week prior to those of group 3. Mode of delivery did not differ between the groups.

The overall pregnancy complication rate was significantly higher in group 1 compared with group 3 (Table I). Furthermore, a clear trend of an increased incidence in specific
Table I. Main pregnancy outcomes

<table>
<thead>
<tr>
<th>Group</th>
<th>Group 1 (n = 10)</th>
<th>Group 2 (n = 30)</th>
<th>Group 3 (n = 30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestational age (weeks)</td>
<td>33.25 ± 3.6$^*$</td>
<td>35.9 ± 2.7</td>
<td>36.9 ± 2.8</td>
</tr>
<tr>
<td>Birthweight (g)</td>
<td>1843.5 ± 431$^*$</td>
<td>2209.7 ± 467</td>
<td>2361.3 ± 505</td>
</tr>
<tr>
<td>Caesarean sections (%)</td>
<td>40</td>
<td>37</td>
<td>37</td>
</tr>
<tr>
<td>Overall complications (%)</td>
<td>90$^*$</td>
<td>70</td>
<td>57</td>
</tr>
</tbody>
</table>

$^*$Significantly different from the corresponding figures in the same row, $P < 0.05$.

**Group 1 = quadruplet gestations; group 2 = triplet gestations; group 3 = spontaneous dizygotic twin gestations. Groups 1 and 2 underwent pregnancy reduction to twins at 10 weeks gestation.

Overall complications = premature contractions, premature rupture of membranes, pregnancy-induced hypertension, gestational diabetes mellitus or discordance > 20%.

Discussion

The results of this study demonstrate that the initial number of fetuses before reduction is inversely correlated with gestational age at delivery and birthweights, and positively correlated with pregnancy complications.

High order multifetal gestations are characterized by maternal complications and disappointing perinatal outcomes. The duration of these pregnancies is inversely related to the number of fetuses. Such pregnancies are, therefore, best avoided by the judicious use of ovulatory agents, and by limiting the number of embryos transferred after in-vitro fertilization (IVF). If, however, such pregnancies occur despite appropriate precautions, then MFPR appears to be a safe and efficacious method for improving perinatal outcome. However, although the reduction of up to nine fetuses was reported (Lipitz et al., 1994a), this procedure is not free of potential additional risks.

Most of the published studies evaluated different technical methods, approaches and timing of the reduction procedure. These important data permit the counselling of the individual patient concerning efficacy and complication rates of the procedure, especially pregnancy losses and premature deliveries. However, data comparing perinatal outcome of twins resulting from MFPR with spontaneous non-reduced twin gestations are scarce. Early studies suggested different conclusions. In a series of 85 cases (Lynch et al., 1990), twins resulting from MFPR were born at a gestational age similar to that generally reported for non-reduced twin gestations. Patients who originally carried quadruplets delivered at a mean gestational age similar to those who originally had triplets (35.5 versus 36 weeks), but had a higher rate of delivery before 32 weeks (14 versus 0%). Donner et al. (1992) also found the outcomes of post-reduction twins and non-reduced twins to be similar. In contrast, Meglar et al. (1991) reported that the mean gestational age at delivery for twins selectively reduced from triplets or quadruplets was significantly lower than that for non-reduced twin gestations (32.6 versus 35.3 weeks), and the groups differed by 605 g in mean birth weight (1841.8 versus 2447.5 g).

In the present study, twins resulting from MFPR were born earlier than those from non-reduced twin gestations. Furthermore, there was an inverse correlation between the initial number of fetuses before reduction and the gestational age at delivery, and birthweight. Patients who initially had carried quadruplets delivered significantly earlier than those who had originally carried triplets or non-reduced twin gestations (33.2 versus 35.9 and 36.9 weeks). There was no statistical difference between patients who initially had carried triplets and those with non-reduced twin gestations, although the former delivered 1 week earlier. These results are similar to most recently reported data; Alexander et al. (1995) compared the obstetric outcomes of 32 post-reduction twin pregnancies with 38 non-reduced twins. They found that the reduced group delivered at a lower gestational age than the non-reduced group, and the gestational age at delivery decreased with a higher number of embryos reduced.

Contrary to previous studies, we also found a higher incidence of pregnancy complications after MFPR, compared with non-reduced twin gestations, especially those of PMC, PIH and PROM. The initial number of fetuses before reduction was positively correlated with pregnancy complications. Evans et al. (1994) reported that the incidence of obstetric and maternal complications did not seem to differ from those reported for spontaneously conceived twins, except for a surprisingly low occurrence (1%) of pre-eclampsia. The authors explained these incidences by the possibility of incomplete data (the patients delivered in a large number of centres worldwide), or by the fact that there is some choice as to which fetuses are reduced. In the present study, although based on a relatively small number of cases, the overall pregnancy complication rate was higher in patients carrying twins reduced from quadruplets or triplets, compared with non-reduced twin gestations (90 and 70 versus 57%). Perhaps these higher incidences are associated with the amount of non-viable remains of fetal and placental tissue after the reduction procedure.

Since twin gestations are at a higher risk for pregnancy and obstetric complications compared with singletons, selective reduction to singletons may be justified (Lipitz et al., 1994b). Brambati et al. (1995) reported the results of 100 post-reduction pregnancies, 32 of which were reduced to singletons and the remainder to twins. The outcome of pregnancies reduced to singletons was significantly better than those reduced to twins. The authors concluded that these results per se make a woman’s request of reduction to a singleton pregnancy ethically justified. Our findings of poorer perinatal outcomes after MFPR to twins, compared with spontaneously conceived twins, may add an additional argument to this clinical and ethical dilemma. More extensive studies are required to establish the optimal number of fetuses to be left alive after MFPR.
References


Received on November 20, 1995; accepted on March 20, 1996