Multifetal pregnancy reduction and selective termination

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Key content
- Multifetal pregnancy reduction (MFPR) and selective termination (ST) are conceptually different procedures.
- Essential prerequisites for delivering these interventions are detailed counselling, multidisciplinary input within a tertiary fetal medicine service, careful choice of operative technique and appropriate gestational age, depending on the type of pregnancy and indication.
- Operative techniques that may be used are chemical, thermal, radiofrequency and laser, depending on chorionicity as well as other factors.
- Intracardiac potassium chloride is appropriate to employ when there is independent chorionicity and carries a lower risk of pregnancy loss; vascular occlusion using radiofrequency ablation, bipolar coagulation or intrafetal laser can be employed in monochorionic fetuses and twin reversed arterial perfusion pregnancies, but carry a higher risk of pregnancy loss.
- Women struggle with decision-making, particularly with fetal reduction, and should be supported with frank discussion of the risks, but also emotionally; the need for emotional and psychological support may long outlast the pregnancy.

Learning objectives
- To know the differences between first trimester MFPR, second trimester cord occlusion and third trimester ST.
- To understand that MFPR is an intervention to reduce preterm birth-related disability in high-order multifetal pregnancies.
- To understand procedural outcomes and complications of MFPR and ST to enable adequate planning for subsequent obstetric care.

Ethical issues
- The decision to undergo ST to improve the chances of survival of one fetus over another may have consequences on the parental project and the grieving process.
- Ethical questions are raised when MFPR occurs following in vitro fertilisation in which more than two embryos were intentionally transferred.
- In uncomplicated twin pregnancies, MFPR to singleton may reduce the risk of late preterm birth, but the benefit in long-term outcomes is less clear.

Keywords: abortion / embryo reduction / feticide / fetoreduction / termination

Introduction

Ever since the introduction of assisted reproduction technology (ART) in the early 1980s, the rate of twins and high-order multifetal pregnancies has increased from 10.1 to 15.8 per 1000 maternities for England and Wales.1 in 2017, this translated to 10 621 women, of whom 10 462 had twins, 154 had triplets and five had four or more babies.1 It is well known that ART – in particular, the number of transferred embryos during in vitro fertilisation (IVF) – is the single biggest contributor to multiple pregnancy.2 Following IVF conception, one in five births results in multiple pregnancy.3 In the UK, guidelines for single embryo transfer have helped counter the rate of high-order multiple pregnancies, and this appears to be the best option for most younger women undergoing ART.4 In addition to the higher incidence of dichorionic twinning, IVF itself doubles the risk of monozygosity compared with natural conception.5 In particular, late blastocyst transfer increases the incidence of monochorionic diamniotic (MCD) gestations.6 Approximately half of twin pregnancies, and virtually all higher-order multifetal pregnancies, are delivered before 37 weeks of gestation.7 Preterm birth is the single biggest cause of lifelong neurodevelopmental morbidity. Cerebral palsy affects approximately 1 in 400 singleton births,8 1 in 100 twin births,9,10 and a markedly increasing proportion for higher-order pregnancies. For triplet births, cerebral palsy affects approximately 1 fetus in 30 (1 in 12 pregnancies),10 1 fetus in 10 quadruplet births (4 in 10 pregnancies)10 and for quintuplets and above, the rate is probably over one in two per pregnancy.

Around the world there is variation in the legality of, gestational age limits for and access to safe termination services.11 Under ground E of the 1967 Abortion Act,12...
termination in England, Wales and Scotland is legal at any gestational age if two registered doctors are satisfied that “there is a substantial risk that if the child were born it would suffer from such physical or mental abnormalities as to be seriously handicapped”. Following the amendment introduced by the 1990 Human Fertilisation and Embryology Act, it was made clear that selective termination (ST) is also covered by the same legislation. In multiple pregnancies, ST is legal under ground E when one fetus is affected by an abnormality that carries significant risk of postnatal disability; or in higher-order multiple pregnancy (such as quadruplet and above) because of the consequent risk of preterm-birth related disability. In normal twin and triplet pregnancies, the magnitude of risk is smaller and ST is usually justified under ground C (when the pregnancy is under 24 weeks and continuing would involve greater risk of injury to the physical or mental health of the pregnant woman than if the pregnancy were terminated).

Although several different terms are often used, the current consensus on terminology is that termination of an abnormal fetus should be described as ST, whereas termination of one or more normal embryos in a higher-order multifetal pregnancy should be termed multifetal pregnancy reduction (MFPR).

The first successful ST was carried out in Sweden in 1978. The embryo terminated was a dizygotic twin affected by Hurler’s disease, and the termination was performed at 24 weeks of gestation. In 1999, a European Society of Human Reproduction and Embryology (ESHRE) workshop addressed the psychological, medical, social and financial implications of higher-order multifetal pregnancy and made evidence-based recommendations for preventing multifetal pregnancy. These recommendations included the use of MFPR as a last resort. A large international case series of MFPR was published in 2001, which underlined the importance of increasing operative experience to reduce unfavourable outcomes when carrying out MFPR.

The objective of this Review is to discuss the indications, technical considerations, outcomes and ethical issues surrounding the provision of ST and MFPR.

**Prerequisites**

Pregnant women requesting a pregnancy termination should have timely access to an appropriately regulated service. Whereas singleton pregnancy terminations can be performed within a general obstetric service or a dedicated private service provider, ST or MFPR should only be provided within a tertiary level fetal medicine (FM) service. Such services should give access to specialist ultrasound diagnosis; counselling by specialists in FM, clinical genetics and neonatology; psychological support by specialist midwives and bereavement counsellors; invasive prenatal diagnosis; and expertise in complex fetal intervention, with an adequate annual case workload to maintain competence, regular audit of outcomes and multidisciplinary care review and oversight.

The number of fetuses and their chorionicity should be documented before 14 weeks of gestation. In cases of uncertain chorionicity, reviewing the archived or printed images from earlier scans can be useful. Proper assessment should include detailed documentation for each fetus to enable ‘labelling’ their position, size, chorionicity, placental location and any anatomic features that may help their correct identification, such as major anatomic abnormalities and markers of aneuploidy. Determination of chorionicity is essential, not only to help estimate the prognosis (with no intervention), but also to determine the method of MFPR or ST. Fetuses with a monochorionic placenta share a common circulation, and the demise of one fetus, with or without intervention, may lead to hypoperfusion injury in the remaining fetus(es), with resulting death or cerebral injury.

All women who are pregnant with triplets or higher-order multiples should be offered the option to discuss MFPR in the first trimester. Those requesting MFPR should be referred to a tertiary FM service between 11 and 14 weeks of gestation, because the procedure-related risks may be increased when MFPR is performed after 16 weeks of gestation. When a fetal abnormality is identified in one fetus of a multifetal pregnancy, women should also be referred to a tertiary service as soon as is practically possible; the UK standard for timely tertiary referral is within 5 days. Adequate time should be provided for the woman to consider the information and give her consent. Documentation should include a written ultrasound report that describes the details of the procedure. In the UK, certificate form HSA1 and notification form HSA4 should also be completed.

**Procedures for fetuses with independent chorionicity**

In the mid-1980s, historical techniques were described, one being the transabdominal insertion of a needle, manoeuvred into the fetal thorax for potassium chloride (KCl) injection. Other techniques were mechanical fetus disruption, air embolisation or electrocautery. The current method of choice for a fetus with independent chorionicity is the direct intracardiac injection of KCl. This is performed as an outpatient procedure under local anaesthesia.

**First trimester multifetal pregnancy reduction or selective termination**

In multifetal pregnancies with independent chorionicity, MFPR is optimally performed between 11 and 14 weeks of gestation. This timeframe is best for two reasons: firstly, there is the increased possibility of spontaneous death of one or more embryos before 11 weeks of gestation, which may
render the procedure unnecessary. Secondly, a detailed structural survey, including nuchal translucency (NT) measurement, is possible during this window, to confirm that all embryos appear anatomically normal. A percutaneous feticide technique is used for the intracardiac injection of a chemical agent to induce fetal asystole. A 20 G or 22 G amniocentesis needle is advanced into the amniotic cavity and then into the fetal heart, through which 0.5–2 ml of 15% KCl is administered until fetal asystole is confirmed.18,19 Aseptic technique is imperative to minimise the risk of procedure-related infection. The role of prophylactic antibiotic cover has not been investigated in trials, but an intravenous single dose of broad spectrum antibiotics is sometimes empirically used. The choice of embryo(s) to be reduced will depend on ultrasound appearance and position in the amniotic cavity. Anatomic features that would increase the risk of a potentially abnormal fetus include large NT, significant discrepancy in crown–rump length (CRL; smaller embryo), markers of aneuploidy (absent nasal bone, abnormal tricuspid and ductus venosus flow) or a major anatomic abnormality. In the absence of any such features, the embryo(s) most technically accessible and furthest away from the cervix should be selected for reduction. When ST is performed for a fetal abnormality during the first trimester, great care should be taken throughout the procedure to correctly identify the affected embryo. In particular, when chorionic villus sampling (CVS) confirms a chromosomal or genetic abnormality, care should be taken to minimise the time interval between the diagnostic CVS and subsequent ST, and the same operator should be perform both procedures. Third trimester selective termination If a fetal abnormality becomes apparent in dichorionic twins (DCDA) or higher-order multifetal pregnancies after 16 weeks of gestation, then a safe alternative to mid-trimester ST is to administer intracardiac KCl feticide at 32 weeks of gestation.22 Although there is a high risk of preterm birth within 3 weeks of this procedure,22 such timing carries no risk of miscarriage and major disability is much less likely. Conversely, mid-pregnancy ST (at 16–32 weeks of gestation) is seldom performed because there is a higher rate of pregnancy loss or severe preterm birth23 and consequent neonatal morbidity or long-term disability. At 32 weeks of gestation, usually after prophylactic steroids have been used, the procedure is performed with aseptic technique by administering an intracardiac injection of 5–10 ml of 15% KCl or 10–30 ml of 1% lidocaine via a 20 G amniocentesis needle.18,24 Terminating the wrong fetus is a possibility,25 so the operating practitioner should take great care to identify differentiating features, such as placental position, fetal sex or a readily visible anatomic abnormality. For the same reason, intravascular administration of KCl via cordocentesis should be avoided. In cases in which ST is performed for a chromosomal or genetic abnormality diagnosed several weeks previously without obvious phenotypic or differentiating features, a repeat confirmatory amniocentesis may need to be performed shortly before the ST procedure.

Procedures for monochorionic fetuses When ST or MFPR is performed on a fetus within a monochorionic pregnancy, chemical feticide must be avoided. In the 1980s and early 1990s, injection of sclerosing agents (such as ethanol or cyanoacrylate-based sclerosants) or embolisation using thrombogenic coils were described as being used to induce vascular occlusion. However, these techniques were associated with technical failure so are no longer used.26,27 Modern vaso-occlusive techniques deliver focused heat to generate occlusive coagulation of the umbilical cord28–30 or a large intrafetal vessel13 and are performed as outpatient procedures under local anaesthesia.

Radiofrequency ablation Radio frequency ablation (RFA) can be used between 15 and 27 weeks of gestation. Using ultrasound guidance, a 17 G (4.5 French) RFA needle is inserted percutaneously at the level of the intrafetal portion of the umbilical cord. Radiofrequency energy is applied at the electrodes (tines) situated on the tip of the RFA needle, until an average temperature of 110°C is achieved in all three tines for 3 minutes.30 Two or three such cycles may be applied until cessation of blood flow is demonstrated by colour Doppler of the umbilical cord. RFA can be used in MCDA pregnancies discordant for fetal anomaly. In cases of severe selective growth restriction,30,32 RFA can be used to minimise the risks to the appropriately grown fetus; if termination is not acceptable, then the alternative of fetoscopic laser ablation of placental anastomoses can be offered. In addition, given that RFA can be performed at slightly earlier gestations, it is the procedure of choice for earlier MFPR of monochorionic embryos in higher-order pregnancies (for instance, monochorionic triamniotic triplets) and also for ST of the acardiac twin in twin reversed arterial perfusion (TRAP) sequence.33

Bipolar diathermy cord coagulation Following a small skin incision, and using ultrasound guidance, an intra-amniotic 2.7 mm or 3.3 mm port is placed under local (or regional) anaesthesia. Bipolar diathermy forceps (2.5 or 3 mm) are introduced to grasp a free loop of the umbilical cord. The cord is fully coagulated along several points using short bursts of 30–50 W bipolar electocautery for up to 60 seconds per burst. The procedure is complete when colour Doppler shows cessation of cord blood flow and fetal asystole. Ideally, umbilical cord thickness should be less than 12 mm. The
procedure is usually performed at between 18 and 27 weeks of gestation because there is an increased risk of co-twin death at gestations earlier than 18 weeks.²⁸,²⁹

Intrafetal laser ablation
A further alternative is the ultrasound-guided intrafetal ablation of intra-abdominal aorto pelvic vessels. An 18 G needle is inserted into the fetal abdomen, adjacent to the pelvic vessels, then a 400-μm laser fibre is advanced 1–2 mm beyond the tip of the needle.³¹ Laser coagulation is performed using an Nd:YAG laser at 40 W until cessation of blood flow in the iliac arteries and umbilical vein is demonstrated. Fetal asystole is confirmed around 60 minutes later. The advantage of intrafetal ablation is that it can be used when a free loop of cord is not easily accessible, such as in TRAP sequence.³⁴

Suture ligation
For MFPR or ST in pregnancies after 26 weeks of gestation, ultrasound-guided suture ligation has been described as an alternative procedure when the cord is too thick for bipolar diathermy cord coagulation (BDCC) or RFA. However, this technique is now seldom used. A single port is inserted into the amniotic cavity and the looped end of a monofilament suture is introduced using 2-mm forceps and placed under the cord. The end of the suture is then grasped around the cord and pulled out through the same port. Extracorporeal knot-tying is applied using an endoloop pushing device, followed by confirmation of cessation of cord flow using colour Doppler.³⁵

Outcomes
The objective of ST and MFPR is to reduce the risk of postnatal disability in the remaining fetus(es) compared with no intervention; however, all such procedures carry an increased risk of early and total pregnancy loss. The magnitude of this risk depends on the starting number of fetuses and their chorionicity but has never been assessed in the context of randomised controlled trials. The best available evidence is in the form of pooled estimates from observational case series. This evidence is summarised in Tables 1 and 2.

Multifetal pregnancy reduction in quadruplets

Multifetal pregnancy reduction in dichorionic triamniotic triplets
In a triplet pregnancy with a monochorionic pair (dichorionic triamniotic, DCTA), first trimester reduction with intracardiac KCl to either the singleton or MCDA twins will increase the risk of pregnancy loss to around 13.3–19.6%.³⁶ However, the risk of severe preterm birth is markedly reduced from 46% to 8% following reduction to singleton, or from 46% to 23.1% for reduction to MCDA twins.³⁶ The benefit in preterm birth and associated morbidity is less pronounced when the resulting pregnancy is MCDA because of the residual risks of twin-to-twin transfusion and selective growth restriction.

Reduction of one fetus within the MCDA pair using RFA or intrafetal laser has been described as an alternative.³¹,³²,³⁸ These techniques allow DCTA triplet gestations to be reduced to DCDA twins and, although the risk of miscarriage does not appear to increase,³⁸ they carry a significant chance of inadvertent co-twin death, which can range from 12% for RFA³² to 46% for laser.³¹ The published series are small and the benefit of these techniques is uncertain when compared with the benefit of these techniques is uncertain when compared
Table 1. Outcomes following multifetal pregnancy reduction and selective termination in multifetal pregnancies

| Indication          | Procedure       | Technique | Gestation (weeks) | Expectant management (%) | Intervention (%) | Expectant management % (weeks of gestation) | Intervention % (weeks of gestation) | Median gestational age at delivery |
|---------------------|-----------------|-----------|-------------------|--------------------------|-----------------|--------------------------------|-----------------------------------|-----------------------------------|
| Sextuplets          | MFPR to DCDA    | KCl       | >10               | 90–99<sup>21</sup>        | 21.6<sup>17</sup> | uncertain                      | 16.9 (<33)<sup>17</sup>              | uncertain                         |
|                     |                 |           |                   |                          |                 |                                |                                   |                                   |
| Quintuplets         | MFPR to DCDA    | KCl       | >10               | 75<sup>21</sup>           | 15.1<sup>17</sup> | uncertain                      | 15.7 (<33)<sup>17</sup>              | uncertain                         |
|                     |                 |           |                   |                          |                 |                                |                                   |                                   |
| Quadruplets         | MFPR to DCDA    | KCl       | >10               | 25<sup>21</sup>           | 12.2<sup>17</sup> | 55.6 (<32)<sup>10</sup>        | 14.2 (<33)<sup>17</sup>              | 31<sup>10</sup> 35<sup>17</sup> |
|                     |                 |           |                   |                          |                 |                                |                                   |                                   |
| TCTA triplets       | MFPR to DCDA    | KCl       | 10–14             | 3.1–7.4<sup>36,37</sup>   | 7.3<sup>36</sup>  | 35.1 (<33)<sup>36</sup>        | 13.1 (<33)<sup>36</sup>              | 34<sup>36</sup> 36<sup>36</sup> |
|                     | MFPR to singleton| KCl       | 10–14             | 3.1–9.5<sup>36,48</sup>   | 8.8–9.5<sup>36,48</sup> | 16.7–19.6<sup>36,48</sup>  | 33.3–46 (<33)<sup>36,38</sup>        | 33<sup>36</sup> 39<sup>36</sup> |
|                     |                 |           |                   |                          |                 |                                |                                   |                                   |
|                     | MFPR to MCDA    | KCl       | 10–14             | 13<sup>36</sup>           | 13.3<sup>36</sup> | 23.1 (<33)<sup>36</sup>        |                                   |                                   |
|                     | MFPR to DCDA    | KCl       | 11–14             | 3.3<sup>31</sup>          | 6.8 (<33)<sup>31</sup> | 8% (<33)<sup>36</sup>         |                                   |                                   |
|                     | RFA*            | KCl       | 12–27             | 14.3–16.7<sup>32,38</sup> | 17.9 (<32)<sup>32</sup> |                                   |                                   |                                   |
|                     |                 |           |                   |                          |                 |                                |                                   |                                   |
| DCDA twins          | ST              | KCl       | 10–16             | 0.7<sup>39</sup>          | 2.1–5.8<sup>17,39</sup> | 12–14.4 (<34)<sup>4,750</sup> | 5.0–7.1 (<33)<sup>17,47</sup>     | 36<sup>31</sup> >38<sup>39</sup> |

DCDA = dichorionic diamniotic twins; DCTA = dichorionic triamniotic triplets; KCl = potassium chloride; MCDA = monochorionic diamniotic twins; MFPR = multifetal pregnancy reduction; RFA = radiofrequency ablation; ST = selective termination; TCTA = trichorionic triamniotic triplets

*Reduction of a monochorionic fetus with intrafetal laser or RFA will lead to co-twin death in 46% and 12% of cases, respectively, with a singleton survivor and median gestational age of 38 weeks; in the remaining cases there will be a continuing DCDA pregnancy with median gestational age of 35 weeks.
First trimester selective termination in dichorionic diamniotic twins

When a severe fetal anatomic abnormality in DCDA pregnancies becomes apparent in the first trimester, the method of choice is administration of intracardiac KCl. The procedure-related risk of pregnancy loss is very low: between 2.1% and 5.8%. Given that the resulting pregnancy is singleton, a small benefit in the incidence of late preterm birth is also likely; the benefit is greater when the indication for the reduced fetus is anencephaly or another condition that carries a risk of preterm birth associated with polyhydramnios.

Second trimester selective termination in monochorionic diamniotic twins

In contrast with early pregnancy MFPR, cord occlusion carries an increased risk of later perinatal morbidity and mortality for the remaining fetus(es). Although cord occlusion generally precludes immediate perfusion injury to the co-twin, in subsequent weeks there is additional perinatal risk associated with preterm prelabour rupture of membranes (PPROM) because of the size of needles or ports used. There is also a higher risk of miscarriage or preterm birth associated with residual dead fetoplacental tissue at mid-gestation (Table 2).

A systematic review of the two most widely used cord occlusion techniques in MCDA pregnancies suggests that both BDCC and RFA have comparable outcomes for the remaining twin, with overall survival rates around 77–79% on pooled data. This means that, following a mid-trimester cord occlusion, there is an overall risk of one in five of losing the co-twin, either soon after the procedure (two-thirds of the losses are fetal), or after delivery (one-third of deaths are neonatal). On meta-analysis of individual patient data, the overall survival is higher with BDCC (BDCC 84% versus RFA 73%), but the incidence of PPROM is lower with RFA (BDCC 23% versus RFA 11%).

In cases of large TRAP sequence, in which the acardiac fetus compromises the pump twin, RFA or intrafetal laser is the treatment of choice. These have an approximately 80% survival rate and can be performed as early as 12–15 weeks of gestation.

Third trimester selective termination in dichorionic diamniotic twins

In DCDA pregnancies, when a severe fetal anatomic abnormality becomes apparent after 16 weeks of gestation, an important clinical dilemma arises. The pregnant woman often would prefer an immediate procedure, but this carries an increased risk of miscarriage (12–15%) or preterm birth for the healthy fetus (over 15%). Some studies have disputed these figures and suggested that mid-trimester ST may be as safe as that in the first trimester, with rates of pregnancy loss of approximately 6%, irrespective of gestation. In any case, a safe alternative is ST with intracardiac KCl of the affected fetus at 32 weeks of gestation. This procedure does not incur any additional risk of miscarriage or severe preterm birth, but carries a 45% risk of delivery in the subsequent 2 weeks. It should therefore be undertaken with steroid cover for the remaining fetus. While waiting for the planned procedure, there is a small possibility that spontaneous preterm labour and delivery will occur before 32 weeks of gestation, which would lead to an undesirable live birth of the affected twin. Such pregnancies should therefore be closely monitored and ST should be expedited if preterm labour appears imminent. Surveillance with amniotic fluid measurement, cervical...
length, or cervical biomarker tests (such as fetal fibronectin) may be useful.

**Ethical and psychological considerations**

To the present day, reproductive choice is hotly debated, with different ethical and legal positions prevailing in different countries. Opposing pro-choice and pro-life viewpoints can be applied in the context of MFPR and ST. Practicing obstetricians should be able to provide unbiased counselling and offer all the reproductive options afforded by the legal framework of their country of practice. When obstetricians have a personal objection to pregnancy termination, a different provider should be able to give a second opinion. Clinicians undertaking third trimester ST may face considerable ethical dilemmas about what condition(s) meet the legal criteria. The legal framework does not specify individual conditions; using a proscribed list of eligible diagnoses would be detrimental because this would not take into account individual circumstances, phenotypic variation or patient choice. Such dilemmas should be resolved by multidisciplinary discussion and consensus. A formal multidisciplinary review forum should be available within a tertiary FM service.

For a severe fetal abnormality, ST may appear to have a much more immediate logical justification than MFPR: the affected fetus has a demonstrable and existing abnormality, which would lead to a significant risk of handicap. On the contrary, for women contemplating MFPR in pregnancies where all embryos appear normal, there is an often unbearable choice: the sacrifice of apparently healthy fetus(es) in the interest of the remaining pregnancy, on the grounds that preterm birth might cause severe problems in the absence of intervention. The ethical difficulties in such a scenario are compounded further when considering which embryo(s) to reduce. Sex selection may become a problem if genetic screening by CVS was previously performed. In such cases where CVS has been undertaken, it would be prudent not to reveal the fetal sex before MFPR, unless CVS is performed to assess a specific sex-linked genetic condition. The pregnant woman should also be counselled that, following MFPR in the first trimester, there is a small possibility of identifying a previously unsuspected abnormality in any of the remaining fetuses in the second trimester, which could create unexpected feelings towards the original MFPR decision.

Higher-order multiple pregnancies are most often the result of ART and may have been the premeditated consequence of multiple embryo transfer. Regulations about single embryo transfer mean that this phenomenon has been curbed for most women in the UK, but many women seek fertility treatment in other countries with less robust regulatory oversight. The intentional transfer of more than two embryos under the prior consideration that MFPR could then be used to reduce their number (in case they are all successfully implanted) is a practice that raises serious ethical questions.

Women undergoing MFPR or ST should be prepared to deal with intensely mixed feelings of grief for their loss and anticipation for the ongoing pregnancy. Among women undergoing MFPR, 30–70% experience acute feelings of anxiety, stress and emotional trauma. At least half of pregnant women affected by such a choice find it very difficult to make the decision. Nevertheless, evidence suggests that long-term emotional response and the risk of postnatal depression following successful MFPR are comparable with those following any other live birth. Temporal trends have suggested a change in women’s attitudes; in a recent, large MFPR cohort, approximately 31.8% opted for reduction to singleton, compared with 11.8% in a older MFPR cohort by the same group. This change is attributed to increased awareness of consequences and perinatal risks in multifetal gestations.

Following MFPR or ST, mode of delivery is usually dictated by standard obstetric considerations and is most often vaginal. Following third trimester ST in twins, the prospect of vaginally delivering a term, stillborn baby can be daunting, so additional counselling and psychological support may be required. A caesarean section is reasonable if this is the maternal preference, following adequate counselling.

Perinatal risk is generally low in DCDA pregnancies. MFPR of healthy DCDA twins to singleton confers a reduction in late preterm birth and a non-significant risk reduction of birth before 34 weeks of gestation. Therefore, in DCDA twins, the balance of benefit in perinatal morbidity versus the risk of the invasive procedure is unclear. Some obstetricians may feel that such MFPR is not clinically justifiable under any of the grounds of current UK law. Conversely, with improved experience, the procedural risk is very low and the outcomes may be marginally improved in a resulting singleton pregnancy.

Reduction from twins to singleton may be particularly beneficial if there is a history of preterm birth or a maternal medical condition (such as renal or hypertensive disorder) that is likely to deteriorate during multiple gestation. Careful counselling is needed, especially when the woman would consider a complete pregnancy termination if she were denied the option of MFPR. Additional support for women facing such difficult choices is available from organisations such as Antenatal Results and Choices (https://www.arc-uk.org/).

**Conclusion**

ST of pregnancy and MFPR are, by the nature of the pregnancy involved, fraught with emotional, ethical and practical difficulties. Attitudes vary widely. Considerable
clinical skill is required and the procedures should not be performed outside of an FM unit. Accurate determination of chorionicity is an absolute prerequisite and will determine the type of procedure, its risks and its benefits. Intracardiac KCl is appropriate when there is independent chorionicity and carries a lower risk of pregnancy loss (under 1 in 10 for a single embryo reduction). Vascular occlusion using RFA, bipolar coagulation or intrafetal laser can be employed in monochorionic fetuses and TRAP pregnancies, but carry a higher risk of pregnancy loss (around one in five). The intended benefit in MFPR is the considerable reduction in preterm birth and consequent risk of disability; with ST it is to prevent birth of an abnormal baby. With TRAP or other complicated monochorionic pregnancies, termination seeks to minimise risk to the healthy fetus from the shared placentation. Women struggle with decision-making, particularly with fetal reduction, and should be supported with frank discussion of the risks, but also emotionally: the need for emotional and psychological support may long outlast the pregnancy.

Disclosure of interests
There are no conflicts of interest.

Contribution to authorship
SB reviewed the literature and wrote the article. LI and CI edited the article. All authors approved the final version.

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