

Intrauterine laser ablation of placental vessels for the treatment of twin-to-twin transfusion syndrome

Interventional procedures guidance

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Your responsibility

This guidance represents the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, healthcare professionals are expected to take this guidance fully into account, and specifically any special arrangements relating to the introduction of new interventional procedures. The guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

All problems (adverse events) related to a medicine or medical device used for treatment or in a procedure should be reported to the Medicines and Healthcare products Regulatory Agency using the [Yellow Card Scheme](#).

Commissioners and/or providers have a responsibility to implement the guidance, in their local context, in light of their duties to have due regard to the need to eliminate unlawful discrimination, advance equality of opportunity, and foster good relations. Nothing in this guidance should be interpreted in a way that would be inconsistent with compliance with those duties. Providers should ensure that governance structures are in place to review, authorise and monitor the introduction of new devices and procedures.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.

1 Guidance

- 1.1 Current evidence on the safety and efficacy of intrauterine laser ablation of placental vessels for the treatment of twin-to-twin transfusion syndrome (TTTS) appears adequate to support the use of this procedure provided that the normal arrangements are in place for clinical governance.
- 1.2 Clinicians wishing to undertake intrauterine laser ablation of placental vessels for the treatment of TTTS should ensure that parents understand that in spite of intrauterine laser ablation treatment, there is still a risk that one or both twins may not survive. A risk remains of serious abnormalities in the development of the nervous system among survivors of TTTS. Clinicians should provide parents with clear written information. In addition, use of NICE's information for the public is recommended.
- 1.3 Clinicians should consider case selection carefully because there are uncertainties about the stages of TTTS for which this procedure is appropriate.
- 1.4 This procedure should only be performed in centres specialising in invasive fetal medicine and by an appropriately constituted multidisciplinary team.
- 1.5 Clinicians are encouraged to collaborate on longer-term data collection across the centres performing intrauterine laser ablation for the treatment of TTTS. NICE may review the procedure upon publication of further evidence.

2 The procedure

2.1 Indications

- 2.1.1 Approximately 70% of monozygotic twins are monochorionic/diamniotic (one placenta with two amniotic sacs). Twin-to-twin transfusion syndrome (TTTS) affects approximately 15% of these pregnancies and perinatal mortality is up to 80% if the syndrome is left untreated. TTTS results from abnormal shunting of blood between the circulations of the unborn twins through anastomoses of the vessels of the shared placenta. Blood is transfused from the donor twin, whose growth becomes restricted and who develops oligohydramnios or anhydramnios (too little or absent amniotic fluid), to the recipient, who usually develops circulatory overload, cardiac compromise and polyhydramnios (too much amniotic fluid). The combination of polyhydramnios in the recipient and oligo/anhydramnios in the donor squashes the donor twin against the wall of the uterus. The syndrome is associated with high morbidity and mortality for both twins. Morbidity among survivors includes cardiac, renal and serious neurological impairment, such as cerebral palsy. About 15% of survivors have long-term neurological sequelae.
- 2.1.2 The options for managing TTTS include expectant management, amnioreduction, septostomy, laser ablation, and selective fetal termination using techniques such as umbilical cord occlusion. In some cases the treatment aim is to enable one twin to survive, as the chances for both surviving are extremely poor. Some parents may choose to terminate the pregnancy because of the high risk of perinatal morbidity and mortality in both twins and the risks of serious long-term morbidity in survivors.

2.2 Outline of the procedure

- 2.2.1 The procedure is performed under regional analgesia or local anaesthesia with maternal sedation. Under ultrasound guidance, a cannula and needle are inserted through the maternal abdominal wall, uterine wall and into the amniotic sac of the recipient twin. The needle is removed, and a fetoscope with a thin fibre to carry the laser energy is then inserted through the cannula. The fetoscope is used to

look at the blood vessels on the surface of the placenta. Placental vessels are then coagulated using the laser. After completion of surgery, excess amniotic fluid in the recipient twin's sac is removed to achieve a normal volume.

2.3 Efficacy

- 2.3.1 In a systematic review that included 10 studies (n=981) assessing laser ablation (both non-selective and selective) for the treatment of TTTS, overall perinatal survival ranged from 61% (87 out of 142) to 70% (210 out of 300); rates for survival of at least one twin ranged from 61% (11 out of 18) to 83% (79 out of 95). In a systematic review that included a single randomised controlled trial of selective laser ablation versus amnioreduction, the likelihood of at least one twin surviving to 28 days was higher with laser ablation than with amnioreduction: 76% (55 out of 72) versus 51% (36 out of 70; p=0.002). This difference was also maintained to 6 months of age (p=0.01).
- 2.3.2 Postnatal neurological sequelae were reported in 8 of the 10 studies included in the systematic review. The incidence of postnatal neurological morbidity ranged from 1% (1 out of 87) to 8% (2 out of 26). Two additional case series that specifically evaluated long-term neurological sequelae reported major neurological abnormalities in 6% (10 out of 167) and 11% (10 out of 89) of twins treated with laser and followed up postnatally for a median of 22 and 38 months, respectively. In the randomised controlled trial it was reported that babies in the laser ablation group were more likely to be free of neurological complications at 6 months of age than those treated with amnioreduction (52% [75 out of 144] versus 31% [44 out of 140]; p=0.003). For more details, see the [overview](#).
- 2.3.3 The randomised controlled trial also reported that median gestational age at delivery was significantly prolonged in the laser ablation group compared with the amnioreduction group (33 weeks versus 29 weeks; p=0.004). Similar results were reported in a non-randomised controlled trial of 173 women with reported median gestational age at delivery to be 33 weeks in the laser group compared with 29 weeks in the amnioreduction group.
- 2.3.4 Only one study (n=101) reported recurrence of TTTS following the procedure in 14 (14%) of pregnancies.

- 2.3.5 The Specialist Advisers commented that there are some uncertainties about whether the procedure reduces the incidence or severity of long-term neurodevelopmental outcomes, and the degree of selectivity required when performing laser ablation. They also expressed uncertainty as to the best treatment for early-stage TTTS.

2.4 Safety

- 2.4.1 The most common maternal complication following laser surgery was premature rupture of the membranes, which occurred in 28% of women (49 out of 175) in a case series evaluating the perioperative complications of laser ablation; 12% (6 out of 49) occurred within 3 weeks of the procedure. In the randomised controlled trial, premature rupture of the membranes within 28 days of the procedure occurred equally in the two groups (9%). Placental abruption and pregnancy loss (miscarriage) occurred in 2% (3 out of 175) and 7% (12 out of 175) of women, respectively, in the case series; and in 1 out of 69 pregnancies (1%) in the laser ablation group and in 2 out of 68 (3%) in the amnioreduction group in the randomised controlled trial. In the randomised controlled trial, pregnancy loss within 7 days after the procedure occurred in 8 out of 69 (12%) of women in the laser ablation group and 3% (2 out of 68) in the amnioreduction group ($p=0.1$). Other complications reported in the studies included amniotic fluid leakage and vaginal bleeding. For more details, see the [overview](#).
- 2.4.2 The Specialist Advisers listed potential complications as premature rupture of the membranes, infection (chorioamnionitis), pregnancy loss, iatrogenic intrauterine death of the donor twin and sometimes of the recipient twin, persistent TTTS and reverse transfusion. The Specialist Advisers also noted that there was a risk of maternal death, although this risk has been reduced with improvements in the technique.

3 Further information

- 3.1 NICE has issued [interventional procedures guidance on septostomy with or without amnioreduction for the treatment of twin-to-twin transfusion syndrome](#).

Sources of evidence

- 3.2 The evidence considered by the Interventional Procedures Advisory Committee is described in the [overview](#).

Information for patients

NICE has produced [information for the public on this procedure](#). It explains the nature of the procedure and the guidance issued by NICE, and has been written with patient consent in mind.

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Endorsing organisation

This guidance has been endorsed by [Healthcare Improvement Scotland](#).