Researchers pioneer revolutionary treatment to reduce disabilities in neonatal twins

March 10 2014, by Kara Bradley

(Medical Xpress)—The number of children suffering severe disabilities after treatment for a deadly condition affecting just over 10% of all identical twin pregnancies could be dramatically reduced after University of Birmingham researchers pioneered a new treatment, in collaboration with other experts in Europe, resulting in better outcomes for babies affected.

Researchers carried out a study into a new, modified laser treatment aimed at reducing the number of babies born with a disability as a result of twin-twin transfusion syndrome (TTTS).

The study, published today in the *Lancet*, reveals that the new technique, know as the Solomon method, can dramatically reduce both the recurrence of TTTS and disabilities which may occur as a result of the condition.

Prof Mark Kilby, Professor of Fetal Medicine in the University's College of Medical and Dental Science and Centre for Women's and Children's Health and director of the Fetal Medicine Centre at Birmingham Women's NHS Foundation Trust, worked on a collaborative randomised controlled trial with experts from five centres in Europe, to compare the Solomon technique and a more conventional laser therapy treatment.

Although the number of babies who died was similar for both treatments, the Solomon technique led to fewer babies being born with

severe complications that could lead to disability – 8% rather than 13% for the conventional treatment.

TTTS is a condition which occurs in 1 in 8 identical twin pregnancies where the foetuses share a single placenta. In this condition, some blood vessels on the surface of the placenta join the circulations of both babies, leading to one baby receiving too much blood, and developing high blood pressure, while the other does not getting enough.

The baby with high blood flow (the recipient) will have heightened kidney function, producing more urine and this leads to excessive fluid in the amniotic sac. The other baby, the donor, will have the reverse problem, with not enough fluid surrounding them. If left untreated, the vast majority of babies – more than 90% - in a pregnancy suffering TTTS will die and of the survivors, 80% will suffer from severe disabilities.

The usual treatment is to insert a thin needle, called a fetoscope, through the mother's abdomen, visualising the placental blood vessels and, with a laser, selectively coagulating the blood vessels to stop the flow of blood between the two babies. However, this treatment, although leading to the live birth of at least one twin in 85% of cases, can leave miniscule blood vessels in place, leading the condition returning, or another rare condition forming, called 'twin anaemia/polycythemia syndrome (TAPS). Such babies are often delivered very prematurely and are at significant risk of disability.

The Solomon technique involves lasering the entire placental vascular equator; that is, lasering the blood vessels but then also a circuit around the placenta in a bid to try to sever any tiny blood vessels which are not visible but may cause problems after treatment.

Claire King and her partner Aaron Scott, who live in Wigan, are all too

aware of the risks of TTTS recurring. When Claire was diagnosed with TTTS 23 weeks into her pregnancy three years ago, she was referred to Prof Kilby at Birmingham Women's Hospital immediately. Prof Kilby confirmed the diagnosis and recommended the then-standard sequential selective ablation surgery – or risk losing both babies.

Claire, a nurse who works in gynaecology, said: "I had a very vague knowledge of TTTS thanks to my work, but as we only look after women in the very early stages of pregnancy, I didn't know too much.

"But you know, everyone knows someone with twins, and you don't hear of these issues. You don't ever think it's going to happen to you."

Claire and Aaron opted for the procedure and Prof Kilby lasered eight blood vessels and drained a litre of fluid which surrounded Alexander, the recipient twin. The procedure was a deemed a success but Prof Kilby warned the family that there was a risk of the condition recurring, and that doctors would want to deliver the boys early between 30 and 33 weeks – although in the event, other complications meant they were delivered at 28 weeks.

Three years on, both boys, Alexander and James, are happy and healthy, but Claire and Aaron are aware that others are not so lucky.

Claire said: "It's only looking back now hearing about other people who have not been so fortunate, so many people have lost one or both twins, that we realise how lucky we were.

"Prof Kilby made everything very clear and very logical, and we knew the surgery was the right thing to do."

The Solomon technique, which will now become the clinical standard technique, will reduce the incidence of TTTS returning and hopefully,

the incidence of twins having to be delivered so early in the pregnancy, with all of the additional risks that entails. In the study, just 1% of the 137 women who were treated with the new technique then suffered a recurrence of the TTTS, compared to 7% of the 135 women who were treated with the more conventional lasering.

And just 3% of women undergoing the Solomon technique developed the related condition of TAPS, compared to 16% of the women in the conventional treatment group. TAPS is a complication following conventional TTTS treatment where some tiny blood vessels remain allowing the very slow transfusion of blood between babies and high haemoglobin levels. It leads to one baby receiving most of the red blood cells and the other being deprived, and can lead to death or severe disability for the twins.

Prof Kilby said: "This study was collaboration between experts in Europe and has led to the modification in treatment of a rare disease affecting identical twin pregnancies. It is a major step forward in the treatment of twin to twin transfusion syndrome. Although this treatment often leads to babies surviving, there have always been concerns that the babies would be born with handicap. The Solomon techniques minimises these risks"

More information: "Fetoscopic laser coagulation of the vascular equator versus selective coagulation for twin-to-twin transfusion syndrome: an open-label randomised controlled trial." Femke Slaghekke MD,Enrico Lopriore MD,Prof Liesbeth Lewi MD,Johanna M Middeldorp MD,Erik W van Zwet PhD,Anne-Sophie Weingertner MD,Frans J Klumper MD,Philip DeKoninck MD,Prof Roland Devlieger MD,Prof Mark D Kilby DSc,Prof Maria Angela Rustico MD,Prof Jan Deprest MD,Romain Favre MD,Prof Dick Oepkes MD. *The Lancet* - 7 March 2014. DOI: 10.1016/S0140-6736(13)62419-8