

Outcomes after Solomon fetoscopic Laser as the primary treatment for twin-twin-transfusion syndrome



OBJECTIVE

Treatment of twin-twin-transfusion syndrome (TTTS) includes fetoscopic laser occlusion (FLOC), cord occlusion and even pregnancy termination. Since the Solomon FLOC technique achieves more complete separation of the twin circulations (Solomon-RCT, Slaghekke et al., 2014), we have adopted this as the primary treatment of TTTS irrespective of disease severity. We aimed to evaluate the outcomes using this treatment approach.

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BACKGROUND

The technique for performing fetoscopic Laser surgery for twin-twin-transfusion syndrome (TTTS) has evolved from a non-selective approach to targeted coagulation of communicating anastomoses along the vascular equator. Most recently the Solomon-RCT evaluated the outcomes where selective Laser surgery was complemented with coagulation of the chorionic plate along the vascular equator.

This trial demonstrated significant reduction of post-laser twin anemia polycythemia sequence (TAPS), recurrent TTTS and histologically identifiable patent intertwin anastomoses at birth. Since equatorial dichorionization Laser (ED-Laser) with the Solomon technique produces more complete separation of the twin circulations we have adopted this technique as the primary treatment for all patients with TTTS, irrespective of disease severity.

METHODS

Patients with TTTS had detailed anatomy ultrasound, Quintero staging, middle cerebral artery peak systolic velocity and cervical length (CL) measurement. Selective growth restriction (sIUGR) was defined as EFW of any twin < 10th percentile based on a twin growth curve. When TTTS criteria were met, ED-Laser and management of obstetric comorbidities was offered irrespective of coexisting sIUGR, CL shortening or placental location. We compared preoperative characteristics in a clinical training program with 2 attending physicians and 2 fellows to outcomes in the Solomon-RCT.

| Case Characteristics | JHU n = 144 | Solomon RCT n = 137 | P-Value |
|--|---------------------|------------------------|------------------|
| Maternal age (years) | 30.6 (5.3) | 30 (5.3) | NS |
| Gestational age at laser | 20 (2.7) | 19.4 (2.6) | NS |
| Placental location: anterior / posterior | 68 (47%) / 76 (53%) | 56 (41%) / 81 (59%) | 0.28 |
| Quintero Stage | | | |
| -1 | 25 (17%) | 21 (15%) | |
| -2 | 48 (33%) | 50 (36%) | |
| -3 | 64 (44%) | 62 (45%) | NS |
| -4 | 7 (5%) | 3 (2%) | |
| Post laser - recurrent TTTS/TAPS | 2 (1%) / 3 (2%) | 2 (1%) / 4 (3%) | NS |
| FDIU within 48 hours of laser | 27 (19%) | 45 (33%) | 0.006 |
| PPROM>2 weeks after laser | 26 (18%) | 57 (42%) | <0.005 |
| Gestational week at delivery | 31.3 (18+5-38) | 32.4 (3.3) | NS |
| Overall twin survival at birth | 234 (84%) | 203 (74%) | |
| No survival | 10 (7%) | 24 (18%) | 0.00625 |
| Single survival | 26 (19%) | 26 (19%) | |
| Double survival | 104 (74%) | 87 (64%) | 0.0267 |

RESULTS

Over 3 years, 144 consecutive TTTS patients undergoing Solomon FLOC had similar stage, placental location and gestational age distribution as the Solomon-RCT (Table).

Size discordance >25% or sIUGR was diagnosed in 52 (36.1%) and 22 (15.2%), respectively; 7 (4.8%) had a CL<25mm. Complete outcome was obtained for 140 pregnancies for comparison with the Solomon RCT.

We performed intentional septostomy less often (7 (5%) vs. 17 (12%); $p=0.024$) but had similar PPROM rate within 2 weeks of Laser (6 (4%) vs 4 (3%); $p=0.27$). Thereafter PPROM was twice as common in the Solomon RCT. Recurrent TTTS or TAPS was similar to the Solomon-RCT rate.

Our Laser to delivery interval of 78.5 days (0-141) was unrelated to preoperative CL (Pearson 0.12, $p=0.331$; median interval 61 vs 82 days for CL<25 and above respectively, $p=0.492$). Our overall survival rates were significantly higher due to a smaller proportion of double demise and higher double twin survival rate at birth.

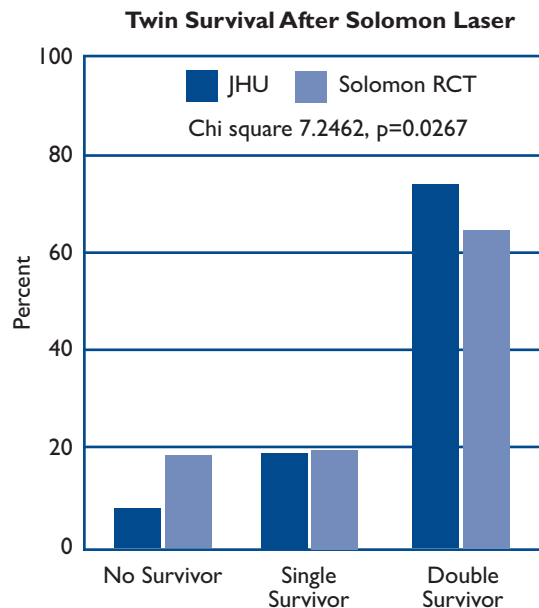


Figure 2. Survival after Solomon laser in a clinical setting where all TTTS cases, regardless of size discordance or cervical length, were offered and underwent laser.

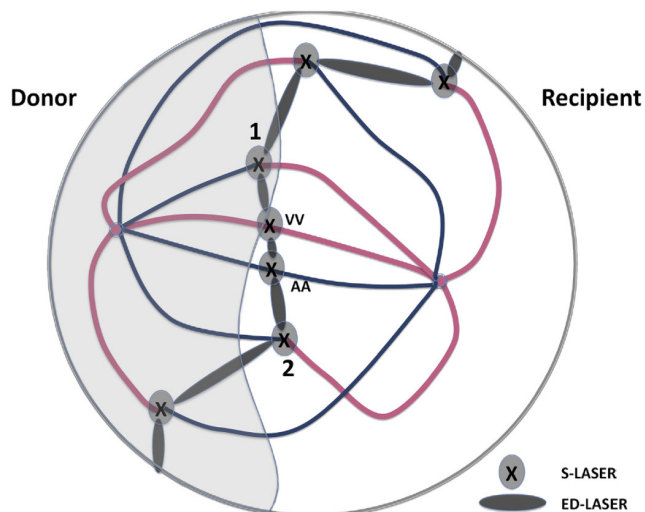
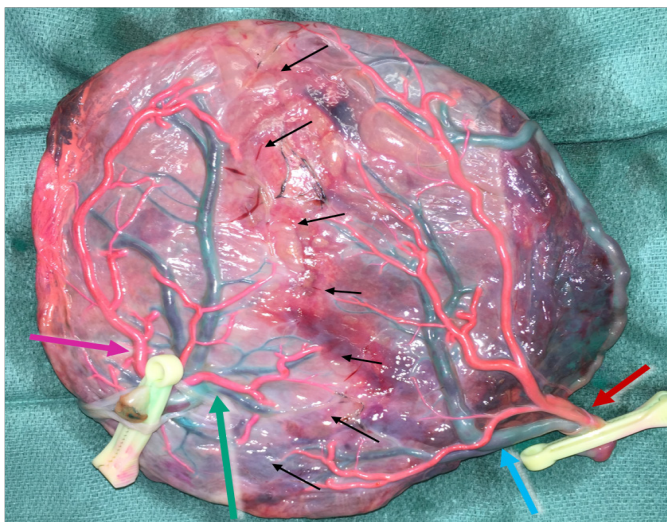


Figure 1. Left - Schematic presentation of ED Laser; Right - placenta after Solomon laser: Laser line = black arrows, Donor arteries = red/red arrow, Donor veins = blue/blue arrow, Recipient arteries = red/pink arrow, Recipient veins = blue/green arrow

CONCLUSIONS

As one of the first centers reporting outcomes of Solomon laser offered to all eligible patients, we report favorable survival rates even with coexisting comorbidities. Solomon laser should be considered as the primary treatment of TTTS.

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