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Twin-to-twin-transfusion syndrome: from amniodrainage to laser

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German obstetrician Friedrich Schatz (1841–1920) and Austrian anatomist Joseph Hyrtl (1810–1894) were the first to study the anatomy of the vascular architecture of the placenta in twins using an injection technique similar to the one used in research nowadays. Schatz produced stunning descriptions of vascular anastomoses and is credited with the first description of a case of twin-to-twin-transfusion syndrome (TTTS; *Arch Gynäkol* 1886;27:1–72). However, for many years the best-known complication of monochorionic twins was the reverse arterial perfusion (TRAP) sequence, called at that time 'acardius anceps or monster'. In the first volume of *BJOG*, Kedarnath Das from Calcutta reported his own experience of a case and a review of 45 cases previously published in the medical literature (*J Obstet Gynaecol Br Emp* 1902;2:341–55). In 1914, G. Balfour Marshall from Glasgow identified polyhydramnios in one sac of a couple 'uniovular' twins at 18 weeks (*J Obstet Gynaecol Br Emp* 1914;25:201–4).

In 1944, John P. Erskine, registrar at Queen Charlotte's Hospital in London, described the case of a primigravida with acute polyhydramnios at 21 weeks (*J Obstet Gynaecol Br Emp* 1944;51:549–51). With the help of X-rays he diagnosed a twin pregnancy and performed an amniodrainage, inserting a lumbar puncture needle and attaching it with rubber tubing to a suction pump on the water tap. Seven pints of liquor were withdrawn, and the procedure was repeated at 24, 28 and 34 weeks. The woman eventually went into labour at 36 weeks, delivering a stillborn fetus and a live born baby of 3 pounds 9 ounces, and was later discharged home.

Transabdominal puncture and removal of large volumes of amniotic fluid had been pioneered by Louis Carnac Rivett, obstetric surgeon at Queen Charlotte's Hospital a decade earlier in both singleton and twin pregnancies (*J Obstet Gynaecol Br Emp* 1933;40:522–5). His technique revolutionised the management of polyhydramnios and had low complication rates compared with previous techniques such as artificial rupture of the membranes. He was invited to present his method in 1946 as the Joseph Brettauer Memorial lecture at the 69th Annual Meeting of American Gynecological Society Transactions.

These ground-breaking reports on the diagnosis and successful treatment of what is now a well-known feature of TTTS failed to identify a relation between polyhydramnios and the vascular anastomoses typical of monochorionic twin placenta described in the second half of the 19th century. In the last two decades, we have obtained a better understanding of the pathophysiology of TTTS. This has led to the development of new technical tools and in particular fetoscopic laser (FLC) coagulation of the vascular anastomoses, with major improvements in perinatal outcomes. In this issue of *BJOG*, the article by Stirnemann and colleagues (pages 1154–62) presents a series of 1092 cases of TTTS treated with FLC since 2000, highlighting how significantly our skills in treating this once lethal complication of multiple pregnancy has improved. Research is now attempting to prevent complications of FLC, for example with membrane sealants, and to introduce non-invasive approaches such as high-intensity focused ultrasound (Shaw et al. *Sci Transl Med* 2016;8:347ra95).

Disclosure of interests

None declared. Completed disclosure of interests form available to view online as supporting information. ■