

The beginning of cardiac surgery

This year marks the 110th anniversary of the first successful operation on the heart. Over the centuries, from the time of Galen, wounds of the heart were considered fatal. With the advent of anaesthesia and of antiseptic surgery, the latter part of the 19th century saw an explosion in the surgery of the abdominal cavity, of the chest, skull and the limbs, yet the heart was considered to be a 'no go' region of the body.

Theodor Billroth himself, that father of modern surgery, from Vienna, stated: 'The surgeon who would attempt to suture a wound of the heart should lose the respect of his colleagues', while in London Stephen Paget wrote, in 1896: 'No new method and no new discovery can overcome the natural difficulties that attend a wound of the heart. It is true that heart suture has been vaguely proposed as a possible procedure and has been done in animals, but I cannot find that it has ever been attempted in practice'.

However, just a year later, Ludwig Rehn (1849–1930), Professor of Surgery at Frankfurt am Main, reported the case of a young man who had been stabbed in the left chest through the fourth intercostal space and was admitted to hospital breathless, pale and shocked. Rehn opened the chest through the left fourth interspace, resected the fifth rib and exposed the pericardium. Blood was seen to be emerging through a pericardial laceration, enlarge-

ment of which revealed a large amount of clot and a 1.5 cm wound in the left ventricle. He wrote:

'I used a fine needle with silk thread. At the beginning of diastole the needle was passed deeply through the muscle about the wound and at the next diastole the thread was tied ... after the first suture the bleeding was diminished. By pulling up on the first suture a second was easily applied. It was frightening to note that the heart stopped after each suture was tied in place. After insertion of the third suture, which was specially difficult to insert because of the movement of the heart, the bleeding stopped completely. The heart now seemed to function well and we could breathe again.'

The pericardial cavity was packed with iodoform gauze. The patient developed an empyema, which was drained and, in spite of this, went on to make a full recovery.

Rehn reported his success both in the German *Archives of Clinical Surgery* (Rehn, 1897a) and in the *Lancet* under the title 'The successful treatment of a wound of the heart' (Rehn, 1897b).

Soon after Rehn's success, Parrozzani in Rome recorded a second success, which was also reported in the *Lancet* by GS Brock (1897), who added as a comment:

'Happily it is only in Italy that surgeons have many opportunities of practising cardiac surgery – opportunities that they owe to the terrible frequency to which the dagger is resorted to in this country in the quarrels of the lower orders'. What would Brock have thought of the scene in our streets in this country today?

In 1907, 10 years after his success, Rehn was able to review no less than 124 recorded cases of operations on cardiac stab wounds, with a recovery rate of 40%. Of the fatal cases, 44% died of haemorrhage and shock and 40% from infection. He advised that the weapon, if still present, should be left in place until the pericardium could be opened fully. He advocated a single intercostal incision carried outwards from the sternal edge and passing through the external wound rather than the large flap used by some other surgeons. If more room was needed, the skin incision was enlarged by converting it to an L shape along the outer margin of the sternum, dividing the exposed costal cartilages and forcibly retracting the flap of skin and bone.

Rehn's successful operation and the subsequent successes of other surgeons showed that there was nothing 'sacred' about the heart – putting sutures into it was difficult but not impossible. It required many decades of experimental animal studies and of clinical trials, through the vicissitudes of operating on the beating heart for stenotic valve disease, to the development of the heart–lung machine and of hypothermia after World War II before today's heart surgery became a routine procedure. But at least the first step had been taken, 110 years ago by Ludwig Rehn of Frankfurt. **BJHM**

Brock GS (1897) Penetrating wound of the pericardium and left ventricle; suture; recovery. *Lancet* **ii**: 260

Rehn L (1897a) Weber penetrirende herz-wunder und herznaht. *Arch Klin Chir* **55**: 315–29

Rehn L (1897b) The successful treatment of a wound of the heart. *Lancet* **i**: 1306

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