Rudolph Matas, pioneer of arterial surgery

Fifty years ago, on 23 September 1957, Rudolph Matas, one of the early pioneers of modern vascular surgery, died at the great age of 97 years. His name and reputation may now be little known to younger clinicians but he is remembered by the 'old guard' with great affection.

Matas was born in 1860 near New Orleans. His father was a Spanish-born physician. The family soon returned to Europe, and young Rudolph spent his first 10 years in France and Spain. His education continued in Texas, Mexico and New Orleans, where he qualified in medicine in 1880. By the age of 34 years he was appointed Professor of Surgery at Tulane University in that city. Here he developed an enormous clinical practice and trained a stream of surgeons. Among these notably was Alton Ochsner, who succeeded Matas as Professor of Surgery and who founded the Ochsner clinic – a rival in fame to the Mayo and Cleveland clinics – as well as a young protegé, Michael DeBakey, who was to pioneer reconstructive arterial surgery.

Matas was one of the founders of the modern surgery of aneurysms of the major arteries. He had access to large numbers of such cases, particularly among the black population of Louisiana, with many examples of syphilitic and arteriosclerotic aortic disease and of post-traumatic aneurysms of the main limb and neck arteries as a result of knife and gunshot injuries.

The treatment of aneurysms from early times had consisted of attempts at compression (to encourage clotting) and of proximal ligation – which was often followed by loss of the limb from peripheral gangrene. One notable advance was ligation of the femoral artery in the subsartorial canal ('Hunter's canal') by John Hunter (1728–93) for the then common condition, especially in coachmen, of popliteal aneurysm. Hunter's first, and successful, operation of this type was carried out in 1785.

In 1817, Astley Cooper (1768–1841) performed the first ligation of the distal abdominal aorta in a patient who was bleeding to death from a leaking iliac aneurysm. This was performed at 9 pm, presumably by candle light.

This was only done because Cooper had previously shown that dogs could survive this procedure by the development of an adequate collateral circulation to the lower limbs and after Cooper had practiced the operation on the human cadaver. The patient died on the second postoperative day; the collateral circulation was indeed adequate on the normal side but not on the side of the aneurysm. The post-mortem specimen (which can be seen in the Gordon Museum at Guy's Hospital) shows that the distal aorta had been meticulously tied.

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It was not until 1923 that the first successful ligation of the aorta was performed – by Matas. The patient was a 28-year-old syphilitic female with a left iliac aneurysm. The swelling became an inert symptomless mass. She died of tuberculosis 15 months later, with the aneurysm cured.

However, Matas' greatest contribution to vascular surgery was to pioneer surgical obliteration or reconstruction of the aneurysm from within the vessel; operations he named 'obliterative and reconstructive endo-aneurysmorraphy' respectively.

His first operation of this type was performed in 1888 on a young man with a traumatic aneurysm of the left brachial artery. Previous attempts at cure by proximal ligation had failed because of retrograde filling of the sac through collateral vessels. Matas opened the sac, sutured the mouths of the feeding vessels from within and then obliterated the sac by sutures placed within its cavity. He wrote:

> **'After suturing all the orifices within the sac, I ordered the tourniquet to be released and found that all the bleeding had stopped. The sac became dry. The patient recovered, with good use of his arm.'**

In 1903, Matas went on to devise his restorative operation, which could be performed especially on traumatic, false aneurysms, in which the wounded artery communicates through a single opening with a well-defined sac. The sac is opened and the artery repaired through it with interrupted sutures, and with preservation of the vessel's continuity.

The incidence of gangrene after these procedures was very low because the operations were confined to patients in whom an adequate peripheral circulation could be demonstrated. His test consisted of compression of the main artery, emptying the limb of blood by means of an Esmarch bandage, then removing the bandage while the main vessel remained compressed. Rapid hyperaemia in the limb indicated an adequate collateral blood supply. If this was insufficient, operation was delayed and collaterals encouraged by regular arterial compression, hot baths and vigorous massage of the limb.

In 1940, at the end of his active career, Matas reported a total of 620 aneurysms of which 101 had been treated by his suture methods with only two deaths and one failure.

Alton Ochsner, Matas' successor in New Orleans, commented 'Matas was not an individual, but an institution!'. BJHM

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