GALEN AND HARVEY – TWO MAJOR INFLUENCES ON THE ORIGINS OF BLOOD TRANSFUSION

A version of this article, written by Phil Learoyd, was originally published in the British Blood Transfusion Society magazine *Bloodlines*

GALEN

Galen

Born Claudius Galenus in 129 AD in Pergamon, Asia Minor, the son of Aelius Nicon, 'Galen' was sent to Alexandria as a young man to be educated, where he studied surgery. On his return to Pergamon he became surgeon to a group of gladiators and later went to Rome, where the emperor Marcus Aurelius held him in high regard and where he worked and wrote until his death

.

Galen followed the methods of medicine and surgery laid down by Hippocrates – helping to perpetuate the fame of the Greek master – using diet, massage and gentle exercise in his management of the sick.

Galen's fame rests with his experimental work rather than on his clinical writings – though he never apparently dissected a human body, his knowledge of anatomy came from dissections of pigs and apes. Using this as a guide he claimed that the 'pneuma' or inspired air entered the lungs during the act of breathing and was then mixed with the blood, which was formed only in the liver and brought from the intestines by the portal vein. He believed that the blood or 'natural spirits' passed to the right ventricle and was carried through 'imperceptible openings' between the walls of the ventricle and became intermingled with the blood arriving from the lungs by what he called the 'arterial vein', now known as the pulmonary artery. Much of the blood of the body was thought to reach the brain where it became the 'pneuma of the soul'.

Galen was influenced by the 'humorism' theory of Hippocrates, which stated that the body was filled with four basic substances, called humours, which are believed to be 'in balance' in a healthy person and that a deficit or excess of any one was the cause of all diseases and disabilities. The four humours were black bile, yellow bile, phlegm and blood, each of which could increase or decrease in the body (as well as ebb and flow around the body) dependant upon diet or activity, affecting the person's personality and physical health. Galen believed that blood was the dominant humour and therefore an excess of this could be treated by bloodletting and purging. It can be argued that Galen's work was the highest peak of Greco-Roman medicine and continued to be revered for many centuries, during which time to no one disputed Galen's theories regarding the movement of blood around the body. This theory regarding the physiology of the circulatory system influenced Western medical practice for over a thousand years until William Harvey published his treatise in 1628.

HARVEY


Harvey

The English physician William Harvey was born in Folkestone in 1578. He was sent to the grammar school in Canterbury and graduated from Caius College, Cambridge. He then went to Padua, Italy, to study medicine and where he graduated as a Doctor of Medicine in 1602. One of his teachers in Padua was Hieronymus Fabricius who identified that there were valves within veins, though Fabricius believed that their role was to prevent over distortion of the veins. It was Harvey who realised that the real purpose of these valves was to prevent a backflow of blood – keeping the blood in motion.

In 1615 Harvey was appointed Lumleian lecturer in anatomy and surgery at the College of Physicians in London. This required him to give two lectures a week on anatomy together with dissection teaching sessions (on human bodies). His lecture

notes from the first year after his appointment identify that it was at this time that he discovered blood circulation – though it took many years of further study and experimentation before he was ready to publish his conclusions. It was Harvey who thought of the heart as a pump to move blood around the body and that the lungs oxygenated it. He could not however identify how the blood moved from the arteries to the veins via capillaries in the extremities of the body, as capillaries are too small to be seen with the naked eye and the microscope had not yet been perfected.

Harvey was the first person to describe in detail that blood flowed through a systemic circulation of blood vessels in one direction, being pumped through the body by the heart (before this discovery, blood was believed to 'wash' forwards and backwards in the vessels like 'the tides of the sea'). Harvey lectured on the subject of blood circulation for a number of years and finally published his findings in a book entitled '*De Motu Cordis*' in 1628.

Harvey's discoveries initiated considerable speculation regarding not only the possibility of the transfusion of blood but also the infusion of other medications or potions. Harvey himself is in fact thought unlikely to have used blood transfusion in relation to his medical practice, though there is evidence that in order to test his theories he pumped water through the circulation of a dead man.

Initially his discovery brought Harvey criticism from other anatomists, as even at that time disagreement with Galan's theories was considered heretical; but Harvey did not waver and his discovery gradually was universally accepted in his lifetime.