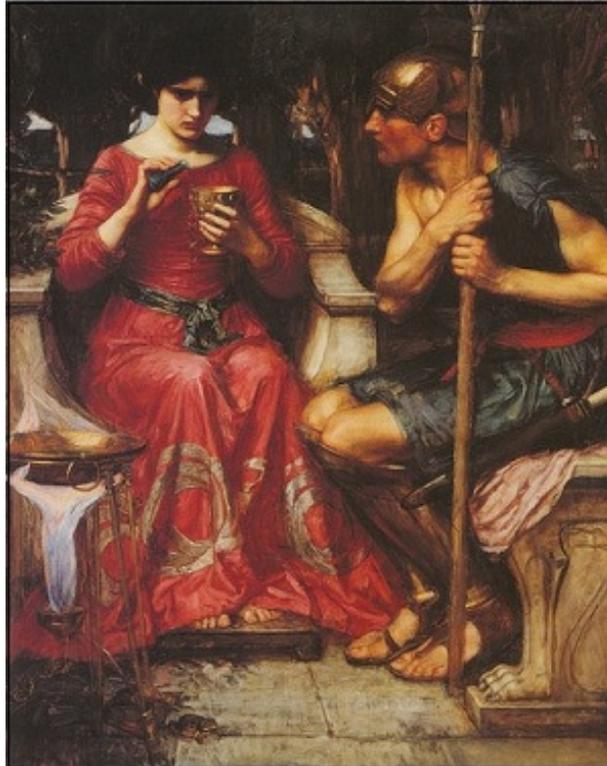


1. History

The practice of blood transfusion, that is the transference of blood from the circulation of one individual to that of another for practical therapeutic purposes, is of relatively recent origin. Although it only became a practical possibility during and shortly after the Second World War the concept of 'transfusion' has a longer history. The idea though of the theoretical beneficial effects of blood transfusion has been recognized for over three centuries.

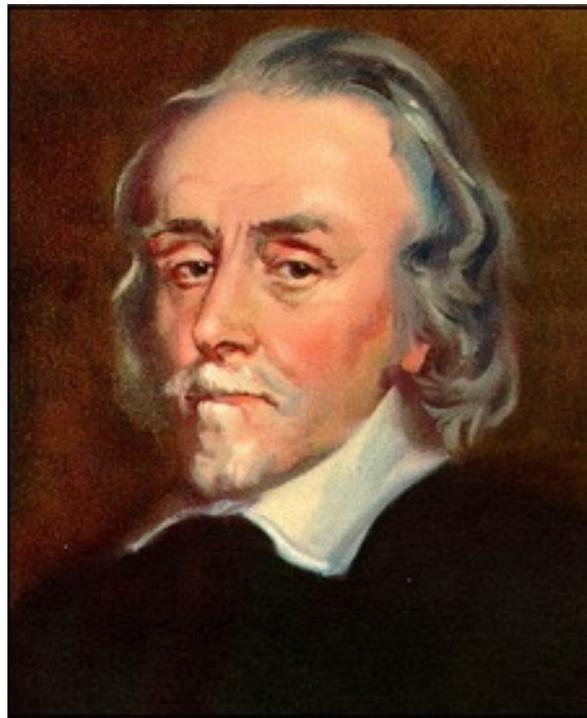


There are many early documented references to the use of blood, for what can be at best described as 'medicinal' purposes. One of the first of these relating to a 'transfusion' is contained in the seventh book of the *Metamorphoses*, by Ovid, who wrote in 43BC, describing how (the witch) Medea rejuvenated Jason's aged father Aeson. In addition to these early mythical writing, there are several noted citations in the Old Testament indirectly bearing on (blood) transfusion. These have a social impact to the present day, relating to the denial of a blood transfusion by certain persons, on religious grounds. It is believed that the ancient kings of Egypt apparently bathed in blood, believing such baths to "... resuscitate the sick and rejuvenate the old and incapacitated", as well as believing it to be a cure for elephantiasis!

This older history is based on the traditional idea of blood as being the 'living-force' of the body. Man must have recognized that loss of blood was frequently associated with weakness and death. This was manifested by Greeks and Romans committing suicide by 'opening a vein' (involving cutting their wrists). Blood was recognized as having numerous mysterious properties, including initially that of carrying both the mental and physical characters of its owner. Early attempts at replacing lost blood involved the drinking of blood by the patient. By choice, this was from a young, healthy, fit person or animal. In classical times the Romans and Greeks, as well as bathing in blood, have reportedly drunk it. Their spectators also rushed into the arena to drink the blood of dying gladiators. These people did this because they felt that such blood was especially beneficial since the athletes were strong and brave. The legend of the vampire originates from this concept. This somewhat mystical fascination with the properties of blood is to some degree still with us today.

An early recognition of the dangers of the custom of 'ingestion' of blood, as well as probably the first rather fanciful description of what could be described as the management of an adverse reaction, is contained in the works of the 13th Century writer Petro de Abano, who wrote: *"He who drinks of menstrual blood or that of a leper will be seen to be distracted and lunatic, evil minded and forgetful, and his cure is to drink of daisies powdered and mixed with water of honey, and to bath in tepid water and to copulate with girls according to the law natural, and to play with pretty girls and young boys; and the antidote is to eat serpents whose heads and tails have been cut off with the edge of a palm frond."*

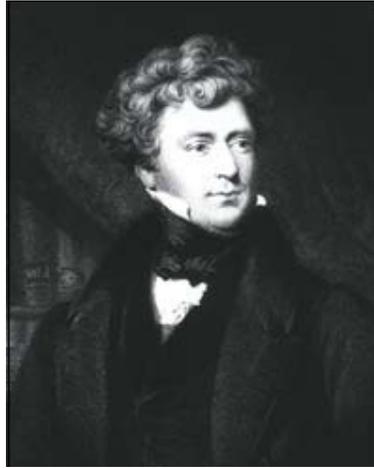
Since most of the ancient and medieval references probably refer to the ingestion of blood, rather than to its infusion, it is in fact difficult to determine when the first authentic attempt at transfusion was actually performed. One of the most frequently quoted candidates for this noteworthy honor is Pope Innocent VIII, Giovanni Cibo, who was reputedly 'transfused' some time between 1490 and 1492. On one occasion, after all means to revive the Pope had failed, it is reported that a physician (or mystic) of dubious reputation, named Abraham Meyer, appeared in the court and promised to save the Pope's life by transfusing him with the blood of young 'donors'. Apparently, three young 10-year-old shepherd boys were selected as donors and Villari states that the blood of the dying Pope was passed into the veins of one of the boys, "... who gave him his own in exchange". The process was apparently repeated with the other two boys. All three boys apparently died shortly after the procedure, possibly as a result of air embolism, but there was no change to the Pope's condition.



One of the most important discoveries permitting the transfusion of blood was then made, that of the formulation of the theory of the circulation of blood, discovered by William Harvey in 1613. William Harvey was a doctor who identified that that blood flowed through blood vessels in one direction. Up until then, blood was assumed to wash forwards and backwards in the vessels, like the tides of the sea.

In 1667, Dr Jean Denys, a young physician on the large staff attached to King Louis XIV, performed numerous dog-to-dog transfusions. On the 15th June 1667, Denys was asked to treat a 15-year-old boy, who had suffered from a fever for many months. Accordingly he was bled to the extent of about three ounces and received in exchange nine ounces of blood from the carotid artery of a lamb. After treatment the boy was not having further ill effects. Denys' second transfusion was performed on a 45-year-old man using a reported 20 ounces of lambs' blood and described the man as feeling stronger than before the transfusion.

in 1678, an edict from the French parliament ruled transfusion to be a criminal act if performed in France. This had repercussions in London where the Royal Society rapidly washed its hands of transfusion as well. Finally, in 1679 the Pope joined the general outcry and also announced a ban on the procedure. As a result, quite understandably, interest in transfusion rapidly waned.



The credit for placing transfusion on a scientific basis and re-awakening interest in its use must be given to James Blundell (1790-1877). James Blundell was a noted physician, physiologist and one of the outstanding obstetricians of his day. He is credited not only with rekindling interests in blood transfusion in the second decade of the 19th century and providing it with a semblance of a national approach, but was the first to transfuse human blood. Many people in fact regard Blundell as the ‘the father of modern blood transfusion’. The first successful transfusion was of a woman who recovered from severe post-partum hemorrhage after receiving eight ounces of blood from Blundell’s assistant during the course of three hours. This case was published in journal ‘The Lancet’ in 1829. James Blundell established, during his interest in transfusion, so many fundamental points that it is difficult to exaggerate the importance of his work in the history of transfusion medicine. Now we’ll skip few decades because a lot of things happened there but still they haven’t found equipment that would be pronounced safe enough to be used worldwide in further blood transplantations.



During the final quarter of the 19th Century, frustration and discouragement with blood as a transfusion product resulted in a brief period of enthusiasm for the transfusion of milk, which was thought of as a ‘blood substitute’. This form of treatment achieved its greatest popularity in the United States between 1873 and 1880, with the milk of cows, goats and humans being used and they thought about this first because there haven’t yet found way to stop blood coagulation. By 1878, J.H. Britton, also wrote in the New York Medical Record, that transfusion using milk would entirely supersede transfusions of blood! However, by 1880 increasing

numbers of adverse reactions associated with the administration of milk led to its general abandonment.

During the latter part of the 19th Century, the Franco-Prussian war was raging in Europe and the possibility of using blood transfusions on the battlefield naturally came to the fore. In 1882, in Paris, Dr J. Roussel, the chief authority at the time reported on a total of sixty successful transfusions performed since 1865. Roussel's 'transfuseur' apparatus was subsequently officially adopted for use by the French Army and apparently used in time of war.



The dangers of infection (both local and systemic) relating to safe transfusion methods started to be resolved when in 1865 Louis Pasteur recognized that bacterial / fungal contamination causes putrefaction and the work of Joseph Lister who in 1867 discovered antiseptics. As a result, the sterilization of instruments and antiseptic methods began to be introduced. **The discovery (in 1900) of the human ABO blood groups by Dr Karl Landsteiner in Vienna was the major step in understanding that these wrong reactions were in fact due to what is now known to be blood group incompatibility.**

Science and technological developments became more and more involved in the development of transfusion during the 20th Century. The development of electrical refrigeration resulted shortly after in the first 'blood bank' being set up in Barcelona in 1936. Current voluntary blood donation process together with the sophisticated methods for the collection, storage, processing and testing of blood required by the complex medical and surgical procedures of the present day are a long way from the early beginnings of drinking the blood of gladiators. However, most of the important developments in transfusion medicine have only been achieved in last sixty years.
