Wound Healing in Medieval and Renaissance Italy:

Was it Art or Science?

Fig 1. Roger of Salerno and a patient.

INTRODUCTION

This paper sets out to describe the developments in wound healing in medieval and Renaissance Italy, roughly from the 11th – 16th Centuries. As previously discussed (Dealey 2002), the writings of a number of Arabian doctors, such as Rhazes, Avicenna and Albucassis, were translated into Latin during this period and so influenced doctors in many parts of Europe. However, change seems to have happened in a rather piecemeal fashion. It is interesting to see how the focus for development moves from one city to another, often due to the influence of individuals.

The Arabian physicians supported the views of Galen, a 2nd Century physician, and his belief in the importance of 'laudable pus', that is, a wound must suppurate (exude pus) before it can heal. If suppuration did not occur naturally, it was to be made to occur. This doctrine was also accepted by many medical commentators in Europe, in particular, the Church espoused this belief, which added to its perceived legitimacy and ensured it underpinned most aspects of wound care (Duin & Sutcliffe, 1992). Many of those undertaking translations of the works of Rhazes, Avicenna, Albucassis and others expounded upon the originals and added their own views in either support or rebuttal. Singer and Underwood (1962) suggest that this resulted in very wordy documents with no new ideas.

THE EARLY YEARS IN SALERNO

Salerno is credited with being the first European university to have a medical school (Forrest, 1982). It was founded in the 9th Century and became the leading centre for surgical training in the 11th Century. Unlike most other universities that were under ecclesiastical control, Salerno was a lay university. This made it easier to include surgery within the medical curriculum as, at that time, members of the clergy were prohibited from practising surgery (Zimmerman & Veith, 1961). In 1140 the first examinations were introduced for doctors and, later, Salerno University was granted the sole right to grant licences to both physicians and surgeons within the domains of the Holy Roman Emperor Frederick II.

One of most famous works to come out of Salerno at this period is the 'Surgery of Roger', which was translated into 15 other languages and was in demand into the 16th Century (Paterson 1988). Roger approached his subject in a systematic way working his way down from the head to the feet. He described a method for treating sword wounds on the head involving lard. If the wound was superficial, he suggested applying the lard directly to the wound. If it was deep, then a thick dressing was to be made out of cloth soaked in molten lard in order to 'draw out the humour'. Roger did not recommend cleaning wounds, as he believed that it would delay healing because of water retention in the wound. He used dressings made from eggs and water, tow and salt, plasters and bandages of fine linen cloth (Paterson, 1988). Although other aspects of Roger's work indicate some advance in empirical observations, there was little new in his methods of wound management. Despite this, Roger is seen as an important figure in the history of medicine. Figure 1 shows Roger of Salerno as the wealthy surgeon with the patient as a supplicant.

However, the importance of Salerno in surgical and wound care development was short lived. By the 12th Century, Bologna University had become the new centre of excellence (Forrest, 1982).

NEW DEVELOPMENTS IN BOLOGNA

Hugh and Theodoric

The School of Surgery at Bologna University was founded around the end of the 12th Century by Hugh of Lucca (1160-1257). He was considered to have been a very innovative surgeon, but he

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Fig 2. Dissection; professor overseeing the operation

left no record of his work for posterity. However, we do have the writings of his famous pupil, Theodoric, (also known as Teodorico Borgognoni) to provide some insight. Theodoric (1205-1298) was a Dominican friar and university-trained both as a surgeon and a physician, a circumstance that was very unusual at the time (Zimmerman & Veith, 1961). Despite working as a surgeon, he eventually became Bishop of Cervia in 1262. In 1267 he completed his *Chirurgia* or surgical textbook, which Theodoric stated was based on the teachings of Hugh.

Theodoric's treatise contains a range of information such as different types of surgical procedures, management of fractures and dislocations, the best methods of extracting arrows and Hugh's principles of wound management. Both Hugh and Theodoric condemned the doctrine of 'laudable pus'. Theodoric considered that it hindered nature and prolonged healing (Zimmerman & Veith, 1961). Edwards (1976) described Theodoric as a medieval antiseptic surgeon who was unfairly denigrated by some of his colleagues and his successors.

It should be remembered that the most common types of wound at that time were likely to be traumatic injuries or war wounds. For these wounds, Hugh proposed that wound edges should be debrided and the wound cleaned of any matter, then wiped dry with fine lint that had been soaked in warm wine and rung out. The wound edges should then be approximated and held in place using compresses of fine clean lint soaked in warm wine and bound in place (Borgognoni, 1955). Theodoric suggested that unless there was excessive pain or heat, wounds should not be disturbed for 5-6 days in case contact with the air should cause suppuration.

Theodoric proposed a variety of treatments for other wound types. He suggested that chronic wounds should be should be cleansed with honey mixed with wine and water of holm-oak or vine ashes. Another alternative was the use of seawater, which could cleanse and dry a wound. Poisonous ulcers were to be washed out with 'desiccative medicine' which could be made from wild pomegranate flowers, oak galls, alum, rind of pomegranate, flowers of red poppy and barley meal. The green ointment of Almansor (1 oz each of rose oil, pure vinegar, honey, long birthwort, feather alum, iris and white lead mixed with 3 oz of verdigris) could be used to 'eat away dead flesh'. Theodoric also considered that diet was important to 'strengthen nature and to generate good blood for rebuilding flesh' (Borgognoni, 1955). He advocated giving patients a diet that included chicken, capons, suckling kid, eggs and good white wine.

William of Saliceto

William of Saliceto (1210-1280) was a contemporary of Theodoric and also taught surgery at the University of Bologna before moving to Verona. Like Hugh and Theodoric he opposed the doctrine of laudable pus and recommended simple dressings such as egg white and rose water (Singer & Underwood, 1962). William also published a surgical textbook, which addressed all types of surgery of the time and also included a section on anatomy, the first such book to do so (Zimmerman & Veith, 1961). The introduction to the book included guidance on the behaviour of the surgeons, physicians and patients. His advice regarding the science and art of surgery was simple, but effective. The surgeon should be thorough in his examination and diagnosis, applying general operating principles to a particular case, but also comforting the patient by "gentle actions, soft words, agreeable and proper" (Zimmerman & Veith, 1961).

Mundinus

A discussion of the developments in medieval and Renaissance Bologna is not complete without mention of Mundinus also known as Mondino de Luzzi (1275-1326). He was a professor of anatomy and surgery and wrote a treatise on anatomy in 1316 based on what he had learnt from undertaking dissection. Dissection had begun at Bologna in the first instance as a form of post mortem for legal purposes. It was commonplace for a professor to sit in an elevated chair to lead a discussion with the students whilst a menial undertook the dissection (Figure 2). Mundinus was unusual, in that he was his own demonstrator (Singer & Underwood, 1962), which adds to the authority of his work. He included a dissection manual in his writings as well as physiology and pathology. However, as by this time, Theodoric's teaching had been largely forgotten or discredited, Mundinus followed the prevailing doctrine of laudable pus as far as wound healing was concerned. In fact, most of his views were based on Galenic principles for it was believed that Galen had discovered all there was to know in respect of medicine.

RENAISSANCE IN PADUA

In the 16th Century, the university in Padua was highly renowned and attracted students from across Europe. One such was Andreas Vesalius (1514-1564), a native of Flanders. Vesalius had previously studied medicine in Louvain

Fig 3. Textbook illustration by Van Kalkar.

and Paris where he was taught according to Galenic principles, before graduating as Doctor of Medicine "with highest distinction" at Padua (Zimmerman & Veith, 1961). The day after graduating he was appointed Professor of Surgery – at the age of 23 years. As part of his teaching duties, Vesalius was expected to teach anatomy and dissection. Like Munidinus, Vesalius undertook his own dissections and demonstrations, which were very popular. The more dissections he undertook, the more aware he became of the number of errors that Galen had made in his descriptions of anatomy. Eventually Vesalius realised that Galen had never dissected the human body and all his writings were based on the dissection of animals and his assumption that humans were the same (O'Malley, 1964). In 1543 Vesalius published his book on anatomy: *De humani corporis fabrica*. This book presented a new approach to anatomy with many beautiful illustrations by van Kalkar, an artist associated with the school of Titian. Figure 3 shows a typical illustration. Lucas (1993) observed that many artists of this time also undertook some dissection, probably the most famous being Leonardo da Vinci, although his anatomical drawings were not published until later.

Vesalius made a major contribution to surgery in general, however, he did not have any particular impact on current thinking in wound healing and management. Later in his career he acted as an army surgeon and had to deal with gunshot wounds. He greatly admired the work of Ambrose Pare and adapted his principles of managing amputation wounds with egg yolks, oil of roses and turpentine, rather than the usual boiling oil (Lucas, 1993).

Although there were further discoveries to be made, Vesalius had laid the foundations for modern study of the human body (O'Malley, 1964). Sadly for Vesalius, this was not recognised at the time his book was published and it raised a great furore, especially in Galenist circles. Ultimately, he died a sad and disappointed man.

DISCUSSION

The title for this paper poses the question as to whether wound healing in medieval and Renaissance Italy was art or science. It is easy to make the assumption that there was a 'lot of art about' and precious little science, especially when considering some of the very beautiful anatomical drawings of the Renaissance. However, it is always important to look beneath the surface. This paper has described the work of some of the important figures of the period and most of it seems to bear little resemblance to modern day wound management. But this is not necessarily the case, as can be seen from a story of the Second World War, told by Popp (1995).

In 1943 Allied troops (American and British) invaded southern Italy and gradually moved north, encountering heavy resistance from the Germans on the way. Eldridge Campbell was a neurosurgeon with the American 33rd General Hospital where they operated on many wounded soldiers. At the start of the war, standard military practice had been to debride the wound, cover it with sulphanilamide powder, pack with vaseline gauze and immobilise. The outcome was often sepsis, long convalescence and limb deformity. As a result a *new* treatment had been developed which involved thorough debridement and primary closure. Campbell was surprised to discover from some older Italian surgeons that this technique had actually been successfully used during the First World War. Further research and discussion at the University of Pisa, revealed that this treatment was actually that described by Theodoric and already described above. Campbell was so enthralled by this discovery that he later translated Theodoric's writings from Latin into English.

This story can be used to support the argument that there was science (albeit limited) as well as art in the practice of wound management in medieval and Renaissance Italy. But it is reasonable to conclude that there was still much to be discovered. ■

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