

Learning

The anatomical and historical background of surgery: major surgical achievements during the Middle Ages and the Renaissance

Andrea A. Conti

Dipartimento di Medicina Sperimentale e Clinica, Università degli Studi di Firenze, Italia

Abstract

Anatomy constitutes the historical and epistemological background of surgery and surgery, in turn, is the area of medicine dealing with the management of injuries and pathologies by means of manual interventions and instrumental devices. As such, surgery may be considered as old as mankind. However, only in the Age of Enlightenment (eighteenth century) was the rigid and negative distinction typical of the past between clinical medicine and surgery overcome. This historical differentiation is by many historians of Western medicine ascribed to the famous Hippocratic Oath, a deontological text attributed to the Hippocratic School (V-IV centuries B.C.). The object of this contribution is the description of the evolution of surgery in the course of the Middle Ages and the Renaissance, periods in which a number of fundamental acquisitions in surgical practice were gained, ranging from a more correct treatment of wounds and lesions to the elaboration of the first effective methods for vessel ligation, from the improvement of amputation techniques to the refinement of trauma surgery, from the major progress in human anatomical knowledge to the invention of new surgical devices, including the obstetrical forceps. Last but not least, the achievement on the part of surgeons of a more codified professional role, their acquisition of a more honourable deontological profile and the definition of their clearer collocation in the sanitary panorama, appear as paramount historical-epistemological achievements typical of the surgery practiced during the Middle Ages and the Renaissance.

Keywords

Anatomy, surgery, history of medicine, middle ages, renaissance, therapy.

Anatomy constitutes the historical and epistemological background of surgery and surgery, in turn, is, according to the Encyclopaedia Britannica, the “branch of medicine that is concerned with the treatment of injuries, diseases, and other disorders by manual and instrumental means” (Encyclopaedia Britannica, 2019). Since injuries are particularly common in children, and since manual practice has always been the first line of intervention to try to manage human alterations and disorders, surgery may be considered as old as mankind. Nevertheless, only in relatively recent times has the tight and negative distinction of the past between clinical medicine and surgery been overcome (Conti, 2011). This historical differentiation has by many historians of Western medicine been ascribed to the famous Hippocratic Oath, a “deon-

* Corresponding author. E-mail: andrea.conti@unifi.it

tological" text attributed to the Hippocratic School (V-IV centuries B.C.) with the purpose of regulating the professional behaviour of the medical class in ancient Greek society (Encyclopaedia Britannica, 2019). In this ethical code, the following is written: "I (i.e. the physician) will not cut persons labouring under the stone, but will leave this to be done by men who are practitioners of this work" (Smith, 1979). Such a prescription literally means that it was neither effective nor safe to perform what today is called "major surgery" in patients. Independently from the technical ability of surgeons, operated people of the time would almost invariably have had a negative prognosis due to haemorrhage, pain and/or infections (Conti and Gensini, 2008), so that the Oath in practice invites the doctor not to undertake this commitment. Unfortunately, some interpreted this passage of the Hippocratic Oath as the documentation that surgeons were to be considered as minor characters if compared to physicians-clinicians, paving the way to a rigid, and inappropriate, separation active till the eighteenth century. However, in the four centuries immediately preceding this period a number of fundamental acquisitions in surgical practice were gained, and these achievements of the Middle Ages and the Renaissance are the object of this contribution.

Until the thirteenth century, the suppuration of wounds was considered a normal and even favourable process; as such it was not to be contrasted. Henri de Mondeville (c. 1260-1316) was among the first scholars, in the Middle Ages, to dispute this opinion, thus allowing the evolution of surgery (Grant, 1974). Commonly considered one of the fathers of French surgery, de Mondeville studied in Montpellier and in Paris. His text "Cyrurgia" ("Surgery", 1312) was one of the first complete treatises of surgery in Europe, surpassed only by the book "Chirurgia Magna" (1363) of Guy de Chauliac (c. 1300-1368) (Glick et al., 2005). Guy, one of the most important surgeons of the Middle Ages in the Western world, described narcotic inhalations for surgical patients, and his fundamental text remained a surgical reference manual for at least three centuries.

Giovanni da Vigo (1450-1525) is remembered for having been the first Italian surgeon to write a report on firearm lesions and their treatment. In his 1514 treatise "Practica in Arte Chirurgica Copiosa", consisting of nine books, da Vigo rendered available a complete picture of the European surgery of his time, testifying that the medication of gunshot wounds continued to remain a major problem in the Renaissance. This is also demonstrated by the number of infections and deaths recorded on sixteenth century battle-fields (Da Vigo, 1514; Gurunluoglu et al., 2003).

The French physician and surgeon Ambroise Paré (1510-1590) was a pioneer both in the treatment of wounds and in the field of the ligature of blood vessels. Paré, by many experts considered the father of modern surgery, while acting as barber-surgeon in the service of Colonel-General René de Montejan, finished the boiling oil commonly used to treat wounds during a battle. He therefore decided to adopt a light mixture of turpentine, rose oil and egg yolk, and observed an obvious improvement in the healing of the soldiers treated with this new intervention if compared to the wounded managed with the conventional burning system (Poirier, 2005). In his paramount text entitled "Méthode de traiter les plaies faites par les arquebuts et autres bastons à feu, et celles qui sont faites par la poudre à canon" (1545), he accurately described the ointment he had elaborated on the battle-field, and he successfully refined it, empowering its emollient and cicatrisant actions (Doe, 1937).

Massive war wounds often forced military surgeons to amputate legs and arms. The availability and diffusion between the Middle Ages and the Renaissance of new and powerful firearms caused, on the one hand, a worsening in severity and frequency of lesions, but, on the other, contemporaneously prompted an improvement in amputation techniques on the battle-fields. The Renaissance improvement consisted in a higher speed in amputation (the best surgeons were considered those able to amputate a thigh in less than thirty seconds), in a larger removal of bone tissue while sparing as much as possible of soft tissues so as to guarantee future healing, and in an increased attention to vessel ligation methods. In the absence of antibiotics (discovered only in the twentieth century), surgeons could not efficaciously fight infections, but it was precisely in the sixteenth century that blood loss, one of the three major historical hurdles to the full implementation of surgery, started to be controlled (Conti and Gensini, 2008).

In the first half of the sixteenth century the study of anatomy, and consequently the practice of medicine and surgery, were revolutionized by the Flemish physician Andreas Vesalius (1514-1564). Following numerous personal dissections of cadavers, Vesalius prepared the first modern illustrated textbook of human anatomy, the "*De humani corporis fabrica libri septem*" (1543), still today retained to be one of the most influential books in the history of Western medicine (Vesalio, 1543). After more than a thousand years, this Belgian scientist questioned the anatomical system of the physician Galen of Pergamum (ca. 129-216), largely surpassed it and led anatomical study into the humanistic climate. Not by chance did Paré translate from Latin into French various chapters of the anatomical manual of Vesalius, including them in his anatomical-surgical treatise "*Anatomie universelle du corps humain*" (1561) in order to give ample diffusion to the new anatomical culture among French surgeons. A great merit of Vesalius was also that of claiming for the physician-surgeon a direct role in personally dissecting human bodies. In the Middle Ages, even during academic lessons of anatomy, this function had been exerted in a non-systematic way by non-graduated secondary figures, such as dissectors (Van Hee, 2016).

In the sixteenth century other branches of surgery underwent relevant evolution, including obstetrics, head injuries management and trauma surgery. In the field of obstetrics the surgeon Peter Chamberlen (1560-1631) should be remembered. Born in France, he studied in England where he became a famous "*accoucheur*" (obstetrician) and to him is nowadays attributed the elaboration of the first obstetrical forceps (Sheikh et al., 2013). With regard to ever present military surgery, the Royalist surgeon Richard Wiseman (1622-1676) practiced for a long time complex operations on the battle-fields and, when he returned to practice civilian general medicine in London, he transferred the notable technical skills he had acquired in war to everyday trauma surgery and to innovative treatments of head injuries (Hull, 1996). Considered by many historians the father of English surgery, in his celebrated book "*Severall Chirurgicall Treatises*" (1676) he furnished the descriptions of hundreds of patients personally treated in the course of the English Civil War (Wiseman, 2011).

To summarize, and in conclusion, many and extraordinary were the achievements in surgery in the course of the Middle Ages and the Renaissance. They ranged from a more correct treatment of wounds and in general of firearm lesions to the elaboration of the first effective methods for vessel ligation, from the improvement of amputation techniques to the refinement of trauma surgery, from the remarkable progress in

human anatomical knowledge to the invention of new surgical devices, including the obstetrical forceps (Temkin, 1951). Last but not least, the identification on the part of surgeons of a more codified professional role, their achievement of a more honourable deontological profile and the definition of their clearer collocation in the sanitary panorama, appear as the major historical acquisitions of surgery in the course of the Middle Ages and the Renaissance (Nutton, 1985).

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