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The Bolognese surgeon Giuseppe Ruggi: how and why the aseptic surgery was introduced in Bologna in the middle half of the XIX century

Sergio Sabbatani, MD,[a] *Fausto Catena, MD,*[c,*] *Flavia Neri, MD,*[a,b] *Carlo Vallicelli, MD,*[a,b] *Luca Ansaloni, MD,*[d] *Massimo Sartelli, MD,*[e] *Federico Coccolini, MD,*[d] *Salomone Di Saverio, MD,*[b] *Rodolfo Catena, MD,*[b] *Daniel Lazzareschi, MD,*[b] *Antonio Tarasconi, MD,*[c] *Hariscine K. Abongwa, MD,*[c] *Belinda De Simone, MD,*[c] *and Antonio Pinna, MD*[b]

[a] *Department of Infectious Diseases, St. Orsola - Malpighi University Hospital, Bologna, Italy*
[b] *Department of Surgery, St. Orsola - Malpighi University Hospital, Bologna, Italy*
[c] *Department of Surgery, Parma University Hospital, Parma, Italy*
[d] *Department of Surgery, Bergamo Hospital, Bergamo, Italy*
[e] *Department of Surgery, Macerata Hospital, Macerata, Italy*

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ABSTRACT

Background: The first reliable statistic data about perioperatory mortality were published in 1841 by the French Joseph-Francois Malgaigne (1806–1863): he referred to a mean mortality of 60% for amputations and this bad result was to be attributed mainly to hospital acquired diseases. The idea of "hospital acquired disease" although vague, included five infective nosologic entities, which at that time were diagnosed more frequently: erysipelas, tetan, pyemia, septicemia, and gangrene. Nonetheless, the suppuration with pus production was considered from most of the surgeons and doctors of that time as a necessary and unavoidable step in the process of wound healing. During the end of the eighteenth century, hospitals of the main European cities were transforming into aggregations of several wards, where the high concentration of patients created poor sanitary conditions and a consistent increase of perioperatory mortality. In 1865, Lister applied his first antiseptic dressing on the surface of an exposed fracture. These experimental attempts lead to an effective reduction of wound infections respect to the dressing with strings used previously.

Discussion: Lister's innovations in the field of wound treatment were based on two brand new concepts: germs causing rot were ubiquitarious and the wound infection was not a normal step in the process of wound healing. The concept of antisepsis was hardly accepted in the European surgical world: "Of all countries, Italy is the most indifferent and uninterested in experimenting this method, which has been so favorably judged from the greatest surgical societies in Germany". This quotation from the young surgeon Giuseppe

* *Corresponding author*. Department of Surgery, Parma University Hospital, Via Cracovia 23, Bologna 40139, Parma, Italy. Tel.: +39 338 8560294; fax: +39 0521 703396.
E-mail address: faustocatena@gmail.com (F. Catena).
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Ruggi (1844–1925) from Bologna comes from his article where he presented his first experiences on aseptic medications started the previous year in the Surgical Department of Maggiore Hospital in Bologna. In his report, Ruggi described the adopted technique and suggested that the medication should be extended to all the surgical patients of the hospital:"… this is needed to totally remove from the hospital all those elements of infection which grow in the wounds dressed with the old method". The experimentation of this new dressing for the few treated cases was rigorous and concerned both the sterilization of surgical tools with the fenic acid (5%) and the shaving of the skin. Ruggi also observed that there was no correlation between the seriousness of the wound and its extension or way of healing: when "simple" cases that "should heal without complication" showed fever he often realized that "it was often due to a medication performed without following the rules for an accurate disinfection and dressing". Ruggi thought that the fever was connected to "reabsorption of pyrogenic substances, which can be removed cleaning and disinfecting the wound" in cases of wounds not accurately dressed and rarely medicated. Frequent postoperative medications of the wound were able to eliminate the fever within 2 h. Ruggi's attitude toward the fine reasoning lead him to introduce the concept of immunodeficiency related to physical deterioration: "… patients treated for surgical disease may sometimes suffer from complications of medical conditions, which initially escape the most accurate investigations… The surgical operation could, in some cases, hold the balance of power".

Conclusions: The obtained results, published in 1879, appear extremely interesting. As he wrote in 1898, for the presentation of his case record of more than 1000 laparotomies, he had started "… operating as a young surgeon without any tutor, helped only by his mind and what he could deduce from publications existing at the moment …".

1. Introduction

The first reliable statistic data about perioperatory mortality were published in 1841 by the French Joseph-Francois Malgaigne (1806–1863); he referred to a mean mortality of 60% for amputations, and this bad result was to be attributed mainly to hospital-acquired diseases [1]. The idea of "hospital-acquired disease", although vague, included five infective nosologic entities, which at that time were diagnosed more frequently: erysipelas, tetan, pyemia, septicemia, and gangrene. We should recall that medical doctors believed that the pyemia was caused by the pus overflowing from the infected wound into the main vessels and thereafter prompting the sudden onset of the disease with shivers and high fever. Moreover, when necropsies were performed in such cases, diffuse metastatic abscesses were often recognized in several internal organs. A different mechanism was proposed for septicemia: they thought that a spontaneous blood rot occurred in those cases resulting in a slow and indolent progression of the disease. The wound secretions were gray-brownish and the infected area was less sore than in case of pyemia. Nosocomial gangrene showed different features at the examination of the wound whose surface was covered with a tight and greasy coat penetrating in the deep layers [1].

Nonetheless, the suppuration with pus production was considered from most of surgeons and doctors of that time as a necessary and unavoidable step in the process of wound healing.

Although this opinion was widely spread in the XIIth century, Ugo Borgognoni from Lucca (1160–1258) believed that wound suppuration was not indicative of the healing process, but of contamination with external detrimental agents. Thanks to the use of ethanol he and his son, Teodorico (1205–1298), were able to heal wounds without suppuration. These observations of surgeons from the Bologna school were then spread in France by Henri de Mondeville (1260–1320), but eventually these methods were abandoned. In the XVth century, Paracelso (1493–1541) disputed again the concept of suppuration as an essential step toward wound healing. He attributed this condition to some external harmful agent, but Paracelso was not able to translate this theory to clinical application in the field of wound treatment. Felix Wurtz, from Zurig in 1563, suggested the utility of a protective rather than a strong treatment. After the invention of firearms, the gunpowder worsened the wounds, which were therefore detoxified with boiling-hot oil and the edges burnt with a red-hot iron. The great doctor Ambroise Parè (1510–1590) was serving during the military campaign in Italy in 1537. He had to treat several shot soldiers and he had not enough oil for everyone, so he used a simple compound for the remainders, made of yolk, oil, and turpentine. The following morning, the soldiers treated with boiling oil were close to death whereas the others had less severe flogosis. After these results, Parè started opposing the treatment of gunpowder wound with boiling oil [2].

In 1616, the doctor from Bologna, Cesare Magati (1579–1647) wrote in his "*De rara medicatione vulnerum*" that "The nature itself and not the medications prescribed by the doctor heals the wounds, because it removes the pus and regenerates the flesh. The best method for wound healing is leaving the nature accomplish its result removing and avoiding the obstacles…" [3].

Unfortunately, these pioneers of the conservative management of the wounds could not influence substantially the surgery of that time.