COMMENTARY

The Surgeon Benedetto Schiassi and the First Spinal Anaesthesia in Italy

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Abstract

In recent years careful research has allowed us to identify that it was the Bologna surgeon Benedetto Schiassi who performed the first spinal anesthesia in Italy. The day was December 27, 1899 and the location was the Umberto and Margherita hospital in Budrio, his birthplace.

There are four of his publications that, combined with the documentation retrieved from the archive of the Budrio hospital, attest to the first execution of a surgical operation with spinal anesthesia.

The patient, a 70-year-old man, needed to undergo urgent leg amputation, as he was suffering from progressive and worsening gangrene of the right foot.

His general clinical condition, characterized by dangerous toxic and infectious state, left ventricle dilatation and arrhythmia, was so compromised that Schiassi considered general anesthesia extremely risky, which at the time was performed with ether or chloroform. The drug used was cocaine, universally recognized as the forefather of all local anesthetics.

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Abbreviations

- cmc. = centimetro cubico/cubic centimeter
- cg. = centigrammo/centigram
- centigr. = centigrammo/centigram

Spinal anesthesia is a technique widely used throughout the world. It involves the injection of a local anesthetic solution into the lumbar subarachnoid space, usually between the second and fourth lumbar vertebrae. It is a commonly practiced

anesthetic technique that can provide surgical anesthesia for procedures below the umbilicus.

The history of medicine reports that the first spinal anesthesia in the world was performed on August 16, 1898 by the German surgeon August Bier at the Royal Surgical Hospital of the university of Kiel. The surgical intervention performed was the resection of a tuberculous ankle joint in a 34-year-old laborer patient who had previously suffered severe adverse effects during general anesthesia. Bier's clinical decision consisted in the administration of cocaine at the lumbar spinal level, with the aim of anesthetizing only the lower limbs. The name given to it by the German surgeon was "cocainization of the spinal cord". The use of this new method was published by Bier himself[1]. The journal *Anesthesiology* recalled the event in 1998, underlining its relevance, success and widespread diffusion, in an editorial entitled "The Centennial of Spinal Anesthesia".[2]

In recent years careful research has allowed us to identify that it was the Bologna surgeon Benedetto Schiassi who performed the first spinal anesthesia in Italy. The day was December 27, 1899 and the location was the Umberto and Margherita Hospital in Budrio, his birthplace.[3] This date, in fact, marks the opening of the way towards the fundamental, promising and long-lasting experience of loco-regional anesthesia in Italy.

Schiassi, known especially for the surgical procedure of vagotomy in the peptic ulcer,[4] following original ideas often aimed at limiting the destructive effect of surgery to the advantage of research into the refunctionalization of organs and systems, also practised other innovative surgical procedures, such as the portacaval shunt in portal hypertension, transmediastinal bronchotomy for the extraction of endobronchial foreign bodies, and minimally invasive techniques to manage varicose veins.

Less known, but of absolute importance, was Benedetto Schiassi's commitment to the field of anesthesiology, a discipline still in its infancy when he began his career.

There are four of his publications that, combined with the documentation retrieved from the archive of the Budrio hospital, attest to the first execution of a surgical operation with spinal anesthesia.[5][6][7][8]

The patient, a 70-year-old man, needed to undergo urgent leg amputation, as he was suffering from progressive and worsening gangrene of the right foot.

In the first article published in the journal *Il Policlinico* Schiassi describes the condition of the patient, formerly a heavy drinker, who presented arrhythmia, left ventricle dilatation and diffuse arteriosclerosis[5]. His general clinical status, characterized by agitation, mental confusion, marked pain in the foot with diffusion to the leg, dangerous toxic and infectious state, was so compromised that Schiassi considered general anesthesia extremely risky. At the time, the latter was in fact performed by inhalation with ether or chloroform and was associated with notable adverse effects and severe mortality if practised in critically ill patients.

The drug used was cocaine, universally considered the forefather of all local anesthetics, and already adopted in topical anesthetic procedure, for instance during eye surgery[9].

This peculiar type of anesthesia was successful, the patient was able to tolerate it and the amputation surgery was completed without any particular problems.

It should be remembered that Benedetto Schiassi used a dose of cocaine lower than that administered by Bier (1 cg. instead of 1.5), obtaining a loco-regional anesthesia that would allow him to perform the surgery while limiting the adverse effects reported by the German surgeon. In addition to reducing the amount of drug, he performed it in a prone position to try to avoid the headache described by Bier.

Already in his first article Schiassi provides a description of the method, relating it to the surgical intervention, the operating timing and the clinical behavior of the patient[5]:

> *Si inietta un cmc. di soluzione acquosa contenente un centigr. di cocaina entro lo speco vertebrale; dopo tre minuti l'infermiere può applicare il laccio di Esmarch alla radice dell'arto senza che il malato avverta dolore. Nell'assoluta analgesia, come se il paziente fosse in preda alla narcosi cloroformica la più profonda, amputo la gamba al quarto superiore. Emostasi e suture. Mentre sto ponendo gli ultimi punti, l'operato dice di avvertire un senso indeterminato di pizzicore: in questo momento si nota che sono trascorsi venti minuti dalla iniezione. Durante questo tempo abbiamo rilevato che a forse dodici minuti dalla somministrazione del farmaco il paziente è sorpreso da leggero sudore, da una dispnea di frequenza di media intensità e che il polso, già abitualmente aritmico, si è fatto più piccolo e più irregolare. Dopo una iniezione di caffeina e una di canfora, il malato torna nelle condizioni ordinarie. Fatta la medicatura, mentre sta per essere trasportato nel suo letto, egli è preso da vari conati di vomito, col quale rigetta alcune boccate di liquido giallo-verdognolo. Nulla fu notato di anormale durante la giornata: solo alla sera fu necessario il cateterismo. Decorso postoperatorio regolare.*
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> *One cmc. of aqueous solution containing one centigr. of cocaine is injected into the vertebral canal; after three minutes the nurse can apply the Esmarch tourniquet to the root of the limb without the patient feeling pain. In absolute analgesia, as if the patient were subjected to the deepest chloroform narcosis, I amputate the leg in the upper quarter. Hemostasis and sutures. While I am placing the last stitches, the patient says he feels an indeterminate sensation of tingling: at this moment it is noted that twenty minutes have passed since the injection. During this time we have observed that perhaps twelve minutes after the administration of the drug the patient presents light sweating, dyspnea of medium intensity and that the cardiac pulsation, already habitually arrhythmic, has become weaker and more irregular. After an injection of caffeine and one of camphor, the patient returns to normal conditions. After the dressing, while he was about to be carried to his bed, he was seized by various retchings, in which he vomited several mouthfuls of yellow-greenish liquid. Nothing abnormal was noted during the day: only in the evening was catheterization necessary. Regular postoperative course.*

In the third article[7] the one published in 1902, Schiassi concisely outlines the anatomical landmarks to be considered safe in performing spinal anesthesia without damaging the spinal cord:

> *Si sa da fatti anatomici bene accertati che il cono midollare non oltrepassa mai nell'adulto la prima od al più la seconda vertebra lombare: ora è chiaro che, introducendo l'ago fra il secondo e il terzo pezzo lombare, non si corre mai assolutamente il rischio di offendere il midollo; né meno i nervi della coda equina possono venire lesi in qualche modo, perché allo inoltrarsi dello strumento puntuto gli elementi nervosi si vanno spostando, favoriti in questo movimento dal liquido spinale in cui, per così dire, sono nuotanti.*
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> *It is known from well-established anatomical evidence that the spinal cord never goes beyond the first or at most the second lumbar vertebra in adults: now it is clear that, by introducing the needle between the second and third lumbar vertebra, there is absolutely no risk of damaging the spinal cord; nor can the nerves of the cauda equina be damaged in any way, because as the needle advances the nerve fibres move, aided in this movement by the spinal fluid in which, so to speak, they are immersed.*

Still in the same publication Schiassi then explains his decision to start performing this type of anesthesia, reaffirming the paternity, already expressed in his previous publication[7]

> *Benchè io appartenga al numero dei chirurghi che considerano la cocaina un farmaco pericoloso, pei suoi effetti di intossicamento generale impossibile a prevedersi, ed un anestetico che trova idiosincresie sfuggenti ad ogni regola, pure i fatti incoraggianti riferiti dal Bier mi indussero a mettere in pratica pel primo in Italia questo metodo, somministrando però dosi assai tenui di sostanza.*
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> *Although I belong to the number of surgeons who consider cocaine a dangerous drug, due to its general toxic effects which are impossible to predict, and an anesthetic which presents idiosyncresies that escape all rules, nevertheless the encouraging facts reported by Bier led me to be the first in Italy to put this method into practice, however administering very small doses of the drug.*

After the historical-scientific contribution published in 2019, five years of our further research followed which provided us with new important details on this important event. Indeed further confirmation of the Italian primacy of this method comes from two articles published by surgeons Raffaele Bastianelli and Andrea Ceccherelli. Both reports having performed spinal anesthesia and both cite Benedetto Schiassi's previous experience as their point of reference for the execution of this method.[10][11]

Schiassi's paternity of the first spinal anesthesia in Italy is also confirmed by the invitation from the Lombardy Doctors' Association on 17 January 1902 to hold a report on the topic.[12]

The literature has not yielded any other documents, scientific research or curricula relating to other Italian surgeons to whom the execution of a spinal anesthesia could be attributed in a period prior to that performed by Schiassi.

We hope that this publication can serve to highlight the importance of this achievement and faithfully reconstruct the authorship of this anesthesia in Italy, its clinical context and the location where it took place, underlining Benedetto

Schiassi's innovative and far-sighted vision in understanding the theoretical value and clinical utility of this anesthesiological method, still widely used today, on the occasion of its 125th anniversary.

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