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Prague 1337, the first successful caesarean section in which both mother and child survived may have occurred in the court of John of Luxembourg, King of Bohemia

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ABSTRACT

Objective: An interdisciplinary historical-medical study, analysis of historical sources, and critical interpretation of the indirect evidence surrounding the childbirth of Beatrice of Bourbon, the second wife of the Bohemian King John of Luxembourg.
Study type: A material-based study founded on a comparative analysis of available private and public sources, particularly surviving letters, and narrative sources. The conclusions are reached based on a textual interpretation according to historical methods.
Settings: Department of Obstetrics and Gynecology of the First Faculty of Medicine of Charles University and General University Hospital in Prague.
Methods and results: Until the second half of the 19th century, medical knowledge of antiseptics and anesthesia was lacking, and techniques for cleaning wounds and staunching bleeding were primitive.
Because no effective anesthetics were known before that time, people did not know how to perform painless abdominal surgery. There are a very few credible reports of caesarean sections performed on living women as early as the 17th century. However, before the 19th century, a caesarean section meant almost certain death for the mother, with related mortality as high as 90%. If the woman did not die of stress from the pain of the abdominal surgery, then she usually died of either bleeding or later of sepsis. However, there is some indirect evidence that the first caesarean section that was survived by both the mother and child was performed in Prague in 1337. The mother was Beatrice of Bourbon (1318–1383), the second wife of the King of Bohemia John of Luxembourg (1296–1346). Beatrice gave birth to the king's son Wenceslaus I (1337–1383), later the duke of Luxembourg, Brabant, and Limburg, and who became the half brother of the later King of Bohemia and Holy Roman Emperor, Charles IV (1316–1378).
Conclusions: From a historical analysis based on the indirect evidence, it is not possible to unequivocally determine whether a caesarean section that was survived by both the mother and child was actually performed in the 14th century. From a medical standpoint in the context of all the known surrounding circumstances, however, this rare event could indeed have taken place.

KEYWORDS

Prague, caesarean section, first, survived, mother, child, John of Luxembourg, Beatrice of Bourbon, 1337, anesthesia, mortality, morbidity

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INTRODUCTION

The caesarean section is currently the most common obstetric operation used to facilitate childbirth. It is also probably the most frequent abdominal operation overall. In some countries, every fourth or even third child comes into the world through caesarean section [1]. Though routine today, however, this surgical procedure has a very long and quite dramatic history, accompanied by many myths and rumors.

Caesarean sections as we know them today are , like all surgeries in the abdominal cavity, a relatively "young" surgery. Fundamental changes occurred in the field of surgery in the second half of the 19th century. Until that time, knowledge of antiseptics/aseptics was lacking, techniques for cleaning wounds and materials to staunch bleeding were primitive, and critically – there was no anesthesia, the basis for pain-free surgery. Opening the abdominal cavity and performing sur-

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gery such as a caesarean section without effective anesthesia, methods to ensure hemostasis, and maintaining an aseptic environment is difficult to imagine. Before the 19th century, a caesarean section meant almost certain death for the mother, with related mortality as high as 90% [25, 29]. If the woman did not die of stress from the pain of the abdominal surgery itself (traumatic shock), then she usually died of either bleeding (hemorrhagic shock) or later of blood infection (sepsis), though individual exceptions have been described.

There is some indirect evidence, however, that the first caesarean section that was survived by both the mother and child was performed in Prague in 1337. The mother was Beatrice of Bourbon (1318–1383), the second wife of King John of Luxembourg (John of Bohemia) (1296–1346). Beatrice gave birth to the king's son Wenceslaus I (1337–1383), who was the half brother of the later King of Bohemia and Holy Roman Emperor, Charles IV (1316–1378).

METHODICS

An analysis of historical sources

Beatrice came to Prague for the first as well as the last time on January 2, 1336, since this where she was to be crowned. In light of the fact that she did not speak Czech or reportedly even German, the future queen had problems with communication in the Czech metropolis. For primarily this reason, King John gave Beatrice into the care of the first wife of his son Charles IV, Blanche of Valois (1316–1348). The king stayed in Prague with Beatrice about two months, because he was involved in organizing anti-Hapsburg forces in Moravia, appearing in Prague in May 1336 [28]. The queen gave birth to her only child, her son Wenceslaus, on February 25, 1337 [12]. Considering the physiological length of pregnancy, she likely became pregnant during the time of John's stay in Prague.

The most concrete information we have about how Wenceslaus came into the world is from two surviving letters of Beatrice written in Latin [12]. The first was written for the representative of the Bohemian city of Kolin. *"Beatrix, dei gratia Boemie Regina, Prudentibus viris, Judici et Juratis Nove Colonie super Alba sibi dilectis, generosi favoris indesinens incrementum. Non dubitantes de vestre fidei constantia vos ex intimis jocundari, dum vestra mens notabiliter de nostro letis auspiciis novellatur, vobis per [...] nostrum Not(arium), cujus absenciam ista vice continentia presens supplet, pro incremento gaudii nunciamus, nos procere deposicionis primogenitur in partu nostro primario salva incolumitate nostri corporis, divina aspirante clementia, parturisse."* The second has no specific addressee, and it is possible that is rather a form meant to be submitted together with an informational document about the birth and sent throughout the kingdom and to important courts: *"Non dubitantes vos nostris letis auspiciis ex animo congaudere, vobis pro incremento gaudii nunciamus, nos XXVme die mensis februarii filium salva incolumitate nostri corporis atque prolis divina aspirante clementia parturisse."* In both cases, the somewhat twisted phrase *salva incolumitate nostri corporis*, is worthy of attention, which has been translated by the author of a biography on Wenceslaus into the somewhat indefinite *"sans que notre corps fût endommagé"* [7], or "such that the soundness of our body is not damaged". However, a word-for-word translation of the Latin would be *"without breaching our body"*. This turn of phrase is very uncommon. This raises the question as to why in that time, when there was no other birth method except *per vias naturales*, it was necessary to emphasize that the soundness of the body was not damaged, as it is in the case of abdominal births. This declaration may have been chosen considering the unconventional circumstances surrounding Beatrice's delivery. The theological politics of the Middle Ages put certain requirements on the woman meant to be crowned. This will be explained below in the section on Hincmar.

Direct allusions to the unconventional childbirth of Beatrice of Bourbon, which seem to indicate a caesarean section, are from a later date.

The first is from the Flemish rhyming chronicle *Brabantsche Yeesten*, the work of an unknown author composed in the first half of the 15th century. According to J. F. Willems, it is known that this author moved in circles very close to the Duke of Brabant John IV, and could have been his advisor or diplomat. The author of the *Brabantsche Yeesten* does not conceal his astonishment of the procedure, that he had never heard of being performed previously – with the exception of Julius Caesar, for which it was named – but nevertheless states that the future duke was taken from his mother's body and that the wound healed. *"Hertoge Wencelijn bequame/Was uut sier moeder lichame/Ghesneden; nochtan, sijt seker das,/Die vrouwe sint daer af genas,/Des ic noit meer en hoerde verclaer/Das van Julius Cesar,/Die, mids dier saken, Caesar hiet/Als doude istorien doen dediet."* [4]

Another report is found in the writings of the archdeacon of the Verdun Cathedral Richard Wassebourg Antiquitez de la Gaule Belgique, where it is tersely stated that during the birth of Wenceslaus, Beatrice was opened up, without her dying. *"A la nativité duquel sa mere Beatrix fut ouverte sans mourir."* [30]

And finally, a third allusion comes from Tomáš Pešina of Čechorod, who writes in his Mars Moravicus, published in the second half of the 17th century, that *"Inter haec anno 1337, nascitur Joanni Regi, ex Beatrice Borbonia Regina filius, vel potius ex utero materno, absque ullo matris incommodo, raro sanè faelicitatis exemplo,*

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exscinditur, Wenceslaus nomine." ("John had a son named Wenceslaus, taken from the queen Beatrice of Bourbon, or rather from the maternal womb, without endangering the mother, rarely such a lucky example of recovery [or healthy fertility]" [21].

Critical interpretations of historical sources

It is not simple to criticize and interpret these sources of information. From the queen's letters, we must focus on the turn-of-phrase *salva incolumitate nostri corporis*. We have little comparable material, though there are a total of three letters available from the same period that are also from the royal environment and similar content. Two of these concern the Luxembourg dynasty. In the first, Charles IV announces the birth of his daughter Elizabeth (1358), addressed to all his subjects. *"Karolus dc. Fideles dilecti. Partum felicem quo filiam nostram Primogenitam in castro Pragensi nostro XVIII. die mensis Martii autore Altissimo peperisse dinoscimur per coquos nostro presentium exhibitores fideles dilectos nunciamus ad gaudium, ut exinde fidei vestre detur exultandi materia consolationisque consurgat presidium speciale."* [19] In the second, Queen Anna informs Pope Innocence VI (1361) of the birth of her son Wenceslaus IV. *"Sanctissime Pater et Reverendissime Domine. Auxiliante altissimo, qui regna regit, et Regibus dat salutem die Veneris ante Dominicam Oculi, hora quasi tertia masculinam sobolem, corpulentam et membris singulis elegantem in lucem produximus huius mundi, et post partum una cum prole, Deo auspicie, grata corporis sanitate gaudemus."* [20] The last concerns the French court and the Valois dynasty. The author is Queen Jane of Bourbon and it is addressed to the citizens of Toulouse, informing them of the birth of the future king Charles VI (1368). *"Capitouls, bourgeois est habitants de la ville de Toulouse. Parce que nous pensons que vous ouïrez volontiers des nouvelles de notre état, nous vous certifions que le troisème jour de ce présent mois, Nostre Seigneur nous délivra d'un fils, à la santé de nous et de l´enfant. Écrit à Paris, ce jour dessus dit."* [3]

When comparing the content of all four letters, discourse analysis shows a clear fundamental discrepancy at first glance. While in the case of Beatrice the main focus was on the state of her body, in the other three letters the emphasis was mainly on the health of the child, and the health of the mother was a secondary theme, if discussed at all. The announcement of the wife of John of Bohemia took therefore quite a different strategy, and presumably attempted to create a fictive reality. She must have had a reason for doing this. It is therefore likely that the court was rebutting a circulating rumor on her difficult birth and the serious health status of the mother. Such a rumor must have come about somehow, however, and have a basis in reality. In any case, this rumor must have been quite strong, because it transformed into a relatively solid tradition, as seen in the references of later writers. The Czech historian Jana Fantysová-Matějková, who studied the life and times of Wenceslaus of Luxembourg in detail during her studies in Paris, leaves the question open, but leans towards the opinion that the Flemish rhyming chronicle, which had a very nationalistic character, attempted to create a portrait of Wenceslaus's entry into this world as rather unconventional and mythical, and thus place him among heroes. The author points out that the Persian hero Rostam, Saint Lambert, and Pope Gregory XIV were all said to have been born this way [8]. This interpretation is naturally possible, but its weakness is that these legends were rather created secondarily around actually important personalities; in this Wenceslaus was not comparable.

One of the authors of this paper, the Czech Historian Milada Říhová, a specialist in medieval medical history, especially the time of the Luxembourg dynasty, has also studied the circumstances around the birth of Wenceslaus of Luxembourg [27]. In that study she did not come to any firm conclusions, but pointed out several important circumstances, most significantly that the Luxembourgs were very interested in the medicinal arts. King John was surrounded by the best physicians of his time, and not just because of his eye problems [26]. A similar conclusion on the birth of Wenceslaus was arrived at by J.P. Pundel, who, however, expressed some skepticism on the matter [3].

If we concede that Wenceslaus was born through caesarean section, and look at this moment from a medical point-of-view, we must foremost find an explanation for the motivation behind performing, for that time, such an unusual procedure. This is not difficult. The literature consistently states that despite some variation the position of the church towards this subject was quite clear. The church synod and council recommended performing an abdominal removal of the baby (secto caesarea), when the mother's life is in danger, or if she dies during childbirth, in the hope that the baby might survive [15]. The reasons were quite – so that even a short-lived child might be baptized. At the same time, this also means that those who decided that Queen Beatrice should undergo such a procedure must have been convinced that she was dying or already dead.

It is thus necessary to search for an explanation as to why the queen so vehemently denied have undergone this procedure, which bordered on the miraculous. Here the argument is not as simple. We can, however, look to the writings of Hincmar of Rheims, from his Coronationes regiae

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of the mid-9th century, from which her actions might be understood as protecting the mental health and bodily sanctity of the crowned woman [11]. The same idea was repeated by an unknown author in connection with the crowning of Queen Ermintrude, wife of Charles the Bald. *"Sit fecunda in tibi placita sobole, sit probata et innocens. Percipiat per hanc sacram misericordiae, laetitiae, et exsultationis olei unctionem, sanitatem mentis, incolumitatem corporis, tutelam salutis, securitatem spei, corroborationem fidei, plenitudinem charitatis."* [2] *Incolumitas corporis*, the phrase used by both authors, thus had a clearly defined role in the concepts of medieval theology. It is now difficult to judge how strong this concept held five centuries later, in the 14th century. On the other hand, it is clear that ceremonies had a highly sacred character and God's protection was an important part. It was therefore understandable why Beatrice, awaiting ceremonial installation as the Bohemian Queen, would feel the need to emphasize that her body, generally understood as an extension of the soul and as a symbol of God's church, was not seriously damaged, and not even disfigured.

In evaluating this event it is also necessary to consider that fact that Beatrice, who died in 1383, did not have any more children. In this context, delays in the crowning of the queen are also conspicuous. This event occurred on May 18, 1337, and as noted by the Bohemian historian Peter of Zittau (the primary author *The Zbraslavská Chronicle*), under very modest conditions. *"... Beatrix regina in castro Pragensi ab Johanne eiusdem ecclesie episcopo die dominico non cum tanta sollempnitate celebri, quantam nos alias priori tempore vidimus in huiusmodi coronacionibus fieri, corona regni Boemie coronatur..."* [6]. Fantysová-Matějková ascribes this delay to problems of the Archbishop of Mainz, since he was the only one who could legally perform this function. As for the form of the coronation, she points out that John of Bohemia had financial troubles at that time [10]. These are both acceptable arguments, but in both cases the queen's health could also have played a role. The name chosen for the child – Wenceslaus – is also noteworthy. This was the same name given in baptism to the son of John and Queen Elisabeth of Bohemia, the future emperor Charles IV, who took his more famous name only at his confirmation, in honor of his uncle King Charles IV of France. It was not common at that time to give the same name to a child, if his sibling in the same lineage was still alive. Fantysová-Matějková found a logical explanation for this in John's attempt to appease the national saint Wenceslaus, from whose tomb in Prague he had recently removed golden statues because of his debts. The king soon after lost vision in one eye [9]. It must also be considered, however, that Beatrice's son had practically no chance of ever ruling Bohemia, and from the beginning it was clear he would rather inherit regions in francophone lands. In Luxembourg, however, the name Wenceslaus was extremely uncommon and did not carry with it any tradition. Could this naming in Prague not have been an exceptional act of gratitude to the patron of the land for extraordinary help during the miraculous birth of the prince?

RESULTS

The conclusions of historians

From the methods of history, it is not possible to come to a clear conclusion whether the child of John of Bohemia and Queen Beatrice of Bourbon indeed was born abdominally by caesarean section. A critical interpretation of the historical sources in light of the further context of the queen's time in Prague leads to the conviction, however, that Beatrice must have undergone an exceptionally difficult and somehow extraordinary birth. From a medical point-of-view, we can thus consider the possible circumstances that must have accompanied such a birth, and articulate the likely conditions, with the state of medical knowledge of the time, that a mother in 1337 must have faced in order to survive such a procedure.

Obstetric observations

A caesarean section in which both the mother and child survived was theoretically possible in the 14th century, but considering the actual state of medical knowledge, difficult to imagine.

Information about human anatomy and physiology was seriously incomplete. There were no skills available for stopping bleeding and suturing wounds. Knowledge of antiseptics or aseptic conditions was completely lacking, and medical specialists had no pharmacological knowledge or the ability to give anesthesia for pain-free surgery until the 19th century.

Several observations from the history of medicine that document the development of human surgical methods

Anatomy and Physiology [23]

Knowledge of anatomy in prehistorical cultures was very low. Even antiquity didn't bring fundamental insights. Notes from the otherwise highly regarded Greek physician Galen (129–200 or 216), which came from animal dissections, were imprecise. The development of anatomy didn't really start until the Renaissance. Interest in the human body at that time was not just the domain of physicians, with excellent anatomical analysis by the

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famed Italian painter, sculptor, architect, and scientist Leonardo da Vinci (1452–1519), for instance. Some of his drawings are remarkable examples of not just his excellent talent for observation, but also experiments for a deeper understanding of human anatomy (with dissections of both human and animal bodies). Despite this, fully scientific contributions were not provided until a Belgian physician, the anatomist Andreas Vesalius (1514–1565) (the Latin form of his originally Dutch name Andreis van Wesel). In 1537 he obtained his doctorate at the University of Padua, where he taught surgery and later became a professor. He was the author of books on human anatomy, with his *De humani corporis fabrica libri septem* (On the Fabric of the Human Body in seven books) having a fundamental influence on the evolution of medicine. Vesalius is considered the father of modern anatomy. Further developments in medical knowledge came in the early modern era with descriptions of blood circulation in the human body by the English physician *William Harvey* (1578–1657). In 1603, he commented on the results of his observations: *"Blood continuously flows and circulates, and this as a result of the beating of the heart."* This astounding discovery for its time completely contradicted the ideas of Galen, and because of this Harvey waited a full 25 years to make his discoveries public. He wanted to be absolutely certain of his correctness, and so spent years patiently performing experiments and observing the hemodynamics of humans. When in 1628 he finally published his *Exercitatio anatomica de motu cordis et sanguinis in animalibus* (An Anatomical Exercise on the Motion of the Heart and Blood in Living Beings), he even became the subject of ridicule. Many physicians considered him "crazy" and his theories as absurd, impossible, and harmful. By the time he died in 1657, however, his critics had to admit that he was right. He thus became the first person in history to correctly describe the function of blood circulation.

A history of surgery

In past times, people have managed to perform surgical operations, with various success. These were normally just on the extremities, however, including amputation. In ancient Egypt there is evidence of trepanning the skull to relieve pressure on the brain. Experienced medical artists knew simple ways to treat several wounds of war or common job-related injuries mostly from agriculture. But abdominal wounds caused by stabbing instruments or animals were treated using salves and balms, with no surgical opening of the abdominal cavity. Incision of abscesses was also performed, treating eyes and teeth. There was also the ability to surgically operate some types of hernias. Some were able to treat bladder stones (lithotomy, or cutting of bladder stones). These procedures were always either transperineal or extraperitoneal, and were associated with high mortality.

Until about the 16th century, surgery in Europe had a lower standing than internal medicine, being considered just a handicraft. Craftsmen such as barbers performed surgical procedures until the late Middle Ages. Only in the mid-16th century did the medical breakthroughs of the discoveries and proficiency of *Ambroise Paré* (1510–1590) appear. This surgeon of French kings (Henry II, Francis II, Charles IX and Henry III) was the first to use ligature of arteries to stop bleeding after amputations. This replaced the previous unbelievably painful method of burning the wound with red-hot iron, hot oil, or just flames, hemostatic methods that often caused more pain and shock in the patient than the original wound. Another father of modern surgery is *John Hunter* (1728–1793), who first operated on his patients and later performed autopsies. He was one of the first physicians, if not the first, who obtained information about patients from autopsies that supplemented or confirmed clinical diagnoses and/or prior treatments. Hunter is considered the founder of today's pathological anatomy. In his time, surgeons of the 18th century still lacked treatment options. There was still no knowledge of effective anesthesia. It is documented, though, that the French surgeon *Claudius Amyand* (1681–1740) performed the first appendectomy in 1735 without the need for anesthesia. This operation was done in the St. George's Hospital in London, on an eleven-year-old boy named Hanvil Andersen, who was originally to undergo a hernia operation. The boy survived the operation and was released from the hospital after a month. There also exists evidence that the American physician *Ephraim McDowell* (1771–1830) removed an ovarian tumor from a woman in 1809, also without the use of anesthetics. The patient's name was Jane Todd Crawford, from Green County, Kentucky. The surgery was performed at home. A number of surgeons during this period are considered "father's of abdominal surgery". However, the first planned abdominal operations began to be performed in the second half of the 19th century. One of the first to perform a planned appendectomy was the Canadian physician *Abraham Groves* (1847–1935), taking place in 1883 under general anesthesia and working under antiseptic principles.

Antisepsis/asepsis

Further steps that allowed surgery to progress to the specialty that we know today appeared in the mid 19th century. It was at that time that *Ignaz Phillip Semmelweis* (1818–1865), *Louis Pasteur* (1822–1895)

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and *Joseph Lister* (1827–1912) recognized the effectiveness of newly used techniques that prevented postoperative infectious complications. The terms asepsis and antisepsis were born. The discovery of the antibiotic penicillin by *Sir Alexander Fleming* (1881–1955) would have to wait until 1928.

The discovery of anesthesia

A fundamental milestone in the history of medicine and in the development of the field of surgery, was the discovery of anesthesia in the mid-19th century. There is evidence, of course, that various healers tryed to reduce pain even in antiquity, giving patients substances with analgesic or intoxicating effects, mostly various products of fermentation (alcohol) or decoctions containing alkaloids or opiates (from poppies, nightshades, or hellebores). However, these methods were insufficient for the deep anesthesia necessary for operative procedures in the abdominal cavity. These operations were extremely difficult before the use of effective anesthetics, mostly because the pain experienced by the patient caused extreme anxiety and stress, preventing the surgeon from performing precise tasks.

Anesthesia with potent anesthetics (ether, chloroform) first made possible more comprehensive and time-consuming operations, including abdominal. Attempts at desensitization during surgery were pursued already in the first half of the 19th century by, for instance, *William Edward Clark* (1819–1898) and especially *Crawford Williamson Long* (1815–1878), using diethylether. This compound had already been produced in 1540 by *Valerius Cordus* (1515–1544), but his innovative experiments with inhalation of ether were not properly documented. Because of this, the discovery of total anesthesia is generally credited to *William Thomas Green Morton* (1819–1868), who not only publically demonstrated his general anesthesia with ether on October 16, 1846, but also properly documented the surgical procedure performed under its effects, done at the General Hospital in Boston. Morton was a dentist, and his first patient with whom he demonstrated the use of ether was *Gilbert Abbott* (1825–1855), a sturdy printer with a congenital vascular malformation in his palate and tongue, which was removed by J. C. Warren. Since that time anesthesia using ether quickly found widespread use in medicine, and greatly contributed to the development of surgery. The word "anesthesia" was suggested by Oliver Wendell-Holmes (1809-1894) of Boston, from the Greek words "an" – without, and "aisthēsis" – sensation.

On January 19, 1847, Doctor (and later Sir) *James Young Simpson* (1811–1870) attended the first birth using ether as an analgesic, in Edinburgh. That same year, Simpson and his friends the chemists *James Matthews Duncan* (1826–1890) and *Thomas Keith* (1827–1895) discovered another inhalable anesthetic, chloroform. On November 8, 1847, chloroform was first successfully used during a birth. Simpson submitted his results five days later to the Medico-Chirurgical Society of Edinburgh, and on November 20, 1847 his discovery was published in the journal Lancet with the title *On a new anaesthetic agent more efficient than sulphuric ether*.

The discovery of regional anesthesia took a longer time, and had to wait for the development of syringes and subcutaneous needles. Both of these technical tools took many years to develop. One of the key steps was taken by *Alexander Wood* (1817–1884), who in 1853 first combined both of these technical components and enabled the subcutaneous application of drugs. The discovery of the effects of cocaine as a local anesthetic belongs to *Sigmund Freud* (1865–1939), the famous psychoanalyst. Freud advised the ophthalmologist *Karl Koller* (1858–1944) to use a cocaine solution for eye operations. Koller followed this advise and published his results in the article *On the use of cocaine for producing anaesthesia on the Eye*, published in 1884 in Lancet. It would be another several decades before surgeons learned to apply this discovery for regional anesthesia when operating on the lower half of the body [18, 22, 31].

The evolution of the caesarean section

In his monograph on the history and evolution of the caesarean section, Volker Lehman – author of *Der Kayserliche Schnitt*, managed to put together a large collection of well-known illustrations of births by caesarean section from ancient times and various authors [16]. It is interesting that in not one of these illustrations is the umbilical cord shown. It is difficult today to judge whether this is just a coincidence, or rather evidence of some symbolical importance of births under unusual circumstances.

Birth by caesarean section is associated with ancient Rome, but certainly not as evidence of care for the pregnant mother. The explanation is quite prosaic – the Roman king Numa Pompilius (715–673 BCE) issued the law of *Lex regia de inferendo mortuo*, which prohibited the burial of a dead woman who was pregnant. Before laying such a woman in the grave, the child first had to be cut out of her body. The notion that caesarean sections in antiquity were performed on pregnant women in order to save their children is just wishful thinking, one that is only possible to believe through the lens of today's medical practice.

From the times of ancient Rome, reports of caesarean sections disappear until the 13th century, from when we have preserved reports of caesar-

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ean sections on dead women (sectio caesarea in mortua). From there it was just a small step to sections on dying (in moribunda) and then living women [16].

In 1582, Francois Roussete described a birth that supposedly took place in 1500, in which the animal castrator Jakub Nüfer of Turgau, Switzerland, operated on his wife who was carrying their first child. He was assisted in this by a midwife and cutter of bladder stones. The child was born live, and supposedly lived to 77 years old. The mother reportedly recovered and gave birth to four more children. The description does not mention cutting of the uterus, however, so some authors doubt that this was a true caesarean section but suggest that it was rather a laparotomy performed for acute abdomen [24, 17].

Nevertheless, Roussete described several other caesarean sections in which he assisted, even though he was not a surgeon. He not only named this type of operation – after the Roman Emperor Gaius Julius Caesar (100–44 BCE), "Enfantement Caesarien" – but also described the techniques of the operation. Roussete's publication was accepted by the medical circles of his time with hesitation, sometimes damning rejection, such as came from Ambroise Paré. Objectors even labeled Roussete a charlatan, since a successful abdominal birth that both the mother and child survived was even long afterwards considered a miracle.

The demonstrably first case of a successful birth by caesarean section was performed by Jeremias Trautmann in Wittenberg, Germany on April 21, 1610. The woman reportedly had an enormous abdominal hernia, with which the pregnant uterus was entwined. During the operation the abdominal wall was sutured, but not the uterus. The child lived to nine years old, but the mother died on June 16, 1610, 25 days after the operation. The mortality of women for similar attempts was almost 100 percent even later. The most common cause of death was excessive bleeding, since the cut uterus (hysterotomy) was not sutured, or from sepsis [5].

The operation was dismissed as barbaric not only by A. Paré, but also by *Jacques Guillemeau* (1550–1613) and the founder of obstetrics François Mauriceau (1637–1709). In England, the first woman to survive a caesarean section was operated on in 1793 by the surgeon *James Barlow* (1767–1893) in Lancashire. The first caesarean section on a live woman in Bohemia was performed by *Josef Staub* after a long drawn-out labor in 1796. The child was born dead, and the exhausted mother died the next day [32].

The almost certain death of the mother prevented caesarean sections from being further spread as a birth method. At the same time, many times a situation occurred that even the most experienced midwife could not help solve. When such a situation occurred, a priest and doctor were usually called – the priest to take care of the spiritual side of the birth and the doctor to tend to the baby and mother. So other methods were sought that were safer for the mother, particularly for the most common indication at that time for surgical interventions during birth – namely cephalopelvic disproportion in women with an extremely narrow pelvis, usually a result of osteomalacic changes. In these cases, in light of the life of the mother operations were usually performed to reduce the size of the fetus (embryotomy), and were done on living fetuses. Reductive surgeries were performed on the head: craniotomy, cranioclasy, craniotrypesis, and excerebration, on the neck: decapitation; as well as on the trunk of the fetus: cleidotomy, embrotomy (in a more narrow sense), and exenteration. The attempt to avoid killing the fetus and endangering the life of mothers with narrow pelvises led to, in addition to artificially inducing premature labor, to the introduction of symphysiotomy. The first successful symphysiotomy was performed by *Jean René Sigault* in 1777. Both induction of premature labor and symphysiotomy for narrow pelvises long competed with caesarean sections. The Italian obstetrician *Edoardo Porro* (1842–1902) deserves credit for increasing the safety of caesarean sections and increasing their use. In 1876, after performing a laparotomy and hysteromy under general anesthesia, and after removing the child, he first clamped the uterus above the wound in the region of the lower uterine segment using copper wire. He then amputated the uterus and sutured the remaining stump of the uterus to the lower abdominal wall. The idea for this method was introduced many years earlier by the German obstetrician Gustav *Adolf Michaelis* (1798–1848), but at that time he was ridiculed. Of the first 100 women operated on in this way, "only" 57 died. Porro introduced to human medicine the idea, revolutionary for its time, of the Florentine physician Cavalini. In 1769 he suggested the removal of the uterus after caesarean sections of pregnant animals, and was successful in this during later animal experiments. Interestingly, the first pregnant woman with a narrowed pelvis operated on by Porro was named Julia Cavalini! [14, 16].

Only in 1882, the Germans Max Saenger (1853–1903) and independently *Ferdinand Adolf Kehrer* (1837–1914) introduced suturing of the hysterotomy using stitches after removing the child and placenta. This reduced mortality in mothers to 25%, and later improvements in operative techniques and indications reduced this to 10% [32].

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The obstetrician Čeněk Křížek, author of the influential Austrio-Hungarian textbook *Základové porodnictví pro lékaře. Se zvláštním zřetelem k části operativní (Fundamentals of obstetrics for physicians. With special consideration of associated operations)* from 1876 states that from the point-of-view of the child, it is better if a caesarean section is performed on a living mother [13]. He notes that in these cases, "almost two-thirds of children" are able to be saved. In contrast, for dead mothers only few children survive, and those in cases when the caesarean section is performed immediately "when her life is extinguished". In the same textbook, he even describes two methods of anesthesia for caesarean sections, comparing the inhalation of chloroform to Richardson's ether spray: "*Instead of anesthetizing the mother with chloroform, Richardson successfully uses local anesthesia with ether (Med. Times and Gazette, 1866, p. 115 et seq., and the Journal of Bohemian physicians, (Časopis českých lékařů) 1866, page 289). For a caesarean section performed by Greenhalgh with a favorable outcome (Medical Times, 1866, p. 363), Richardson gave local anesthesia using ether spray, for the reason that the very sensitive mother was in danger of strong nausea after being given chloroform, which would have complicated the operation. In contrast the use of ether leads to less bleeding and better retraction of the uterus. In addition, the mother, who is alert while anesthetized with ether, follows instructions better, and so does not push as much on the diaphragm, so the operative wound is easier to see and is not pushed into the intestinal wound. This method is very advantageous because one needs not be concerned with the risks such as those presented by anesthesia with chloroform. Anesthesia with chloroform, that is, must be deep. Ether used for this purpose should be completely clean. Richardson's apparatus must create a completely fine spray, but care must be taken that the scalpel must not cut the skin until the skin turns white from cold. In more sensitive individuals, the skin can be coated beforehand with olive oil, but the end of the tube for its application must be 4 cm away from the skin that is already desensitized, because the ether spray is affective for about ¾ of a minute.*"

The author does not mention desensitization of deeper layers. That the process of the operation described is dramatic is reflected in the fact that the author emphasizes that a minimum of eight assistants is necessary. Their main role is in pulling back the intestines, daubing the wound with sponges soaked in cold water, and especially immobilization and reducing movement of the agitated mother when experiencing pain. The assistants had the task of preventing the mother's body from moving, including movement of her legs.

Křížek also describes techniques for care for the hysterotomy after birth of the placenta. He exhorts readers to use new, soft and clean pieces of sponges that are soaked in ice water, and placing small pieces of ice in the uterine space. He also warns of letting intestinal loops or the omentum push into the uterine space, as they could become strangulated, In addition, he emphasizes that it is better to avoid using stitches to close the hysterotomy, reasoning that the stitches would be abrasive and that there would be problems with later removal; however, he agrees with leaving them in situ. Though he describes the caesarean section in a hospital setting, in the 1870s there was still no mention of aseptic procedures [13].

In the context of the extant sources of information on the chronology and evolution of medicine, it is clear that cases in which both the mother and child survived a pregnancy ended by caesarean section belong to the 19th century. If such a case occurred earlier, it must have been an extraordinary situation, accompanied by huge coincidences.

DISCUSSION

Could such huge coincidences have really happened?

In the case of the Prague birth, such coincidences indeed could have happened. They could primarily be explained by the place this event happened – Prague was a center of education, but also of the medical care of the royal family. In light of the health of John of Bohemia, a number of the most educated physicians of the time were present around the king. It can be presumed that they had the skills for the procedure, that is, cutting out a fetus from a dead or dying pregnant woman. Considering what we know, it can be rejected *a priori* that it was a case of deliberately saving the mother. In fact, the abdominal removal of the child from an apparently dead mother could partly explain the event described.

If that is indeed what happened, then with likelihood bordering on certainty Beatrice of Bourbon was considered to be dead when the procedure occurred. One explanation could be seizures as a complication of eclampsia. The cut would have had to be made immediately after the onset of such a state. The pain from the operation may have been the reason for a change in consciousness or awakening, and the stress reaction of the mother could also hypothetically explain why she did not bleed to death.

Suturing of wounds, especially of the abdominal wall, was a completely unknown procedure at that time. And that later complications did not arise from the non-sterile environment the operation was performed in push this hypothesis to the edge of reality. On the other hand, there is written evidence that using similar methods,

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with no anesthesia, surgical hemostasis or antiseptic conditions, the first experiments removing children through the abdomen after labor lasting several days were performed in the 17th to 19th centuries, and almost always in a home setting. It was very rare, but some women survived these operations.

CONCLUSION

The circumstantial evidence and interpretations that are available today attest to extraordinary circumstances surrounding Queen Beatrice´s childbirth. Even more considering that circumstances surrounding birth were not commonly made public in that age.

The indirect evidence that historians have been able to collect, again partly due to the presence of the royal family and their stay in Prague, as well as the writings related not just to their rule but also to the significance of the Luxembourg hereditary line, shift interest in remarkable delivery from mere speculation to the realm of reality, with with cesarean section being a rational explanation of the circumstances.

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