The History of the Low Transverse Cesarean Section: The Pivotal Role of Munro Kerr

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ABSTRACT: Cesarean section has undergone a transformation, which has radically changed the prognosis of both the pregnant woman and her unborn child. The attributed mortality rate of Cesarean section during the 19th century was over 50% worldwide. Today, mortality from Cesarean delivery is rare. However, the technique of transversely incising the uterus in its lower uterine segment, although less than a century old, is passed on from instructor to apprentice, often without either of them being aware of its noble history. In this brief review, we discuss the reported history regarding this incision and the significant role played by John Munro Kerr.

KEY WORDS: Cesarean section, low transverse incision, classical incision, uterine incisions, John Munro Kerr

Cesarean section techniques have undergone modernization with dramatic improvement in maternal mobility and mortality.
In the late 1800s and early 1900s, there were at least four milestones in the improved prognosis of Cesarean section techniques for entering the abdominal cavity to access the uterus.

Figure 1. Cesarean section techniques for entering the abdominal cavity to access the uterus.

(A) Kronig incision
(B) Kerr incision
(C) Sanger: classical (high vertical) uterine incision
(D) Kronig: vertical uterine incision in the lower uterine segment
(E) Kerr: transverse lower uterine segment incision
antibiotics were developed, one of the greatest fears was entering the peritoneal cavity with the resultant risk of peritonitis. Years earlier, in 1824, Phillip Physick, considered the “father of American surgery,” was a leading figure to propose that a portal of entry to the lower uterine segment could be made by separating the unopened lower sac of peritoneum [8], yet he never performed the operation himself. Kehrer, however, adapted this approach by performing the technically difficult dissection outside the peritoneal cavity to obtain an accessible window on the uterine cervix (the lower uterine segment). He then entered the uterus by performing a transverse incision into the cervix at the level of the internal os (uterus). There was remarkably little bleeding, and the incision was easily closed. In practice, however, it was extremely difficult to avoid buttonholing of the peritoneum and bladder, and the technique was modified in 1909 by Wilhelm Latzko of Vienna. It is possible that Kehrer also experimented with a transperitoneal approach to the lower uterine segment. Very little else is known about Kehrer, and he never reached prominence, perhaps because he later became involved in performing non-indicated operative sterilizations on women [15].

In 1912, another German gynecologist, Bernard Kronig, developed a technique for entering the abdominal cavity to access the uterus through a low vertical incision in the lower uterine segment [Figure 1]. Occasionally, the incision would extend into the vagina or into the body of the uterus. In the early 1900s, this operation was gaining favor throughout Europe and North America. Each of these operations had advantages and disadvantages. Each had its own school of proponents and adversaries. It took the ingenuity and capability of John Munro Kerr to extract the most important elements of the work of his predecessors. He was the first physician in the United Kingdom to extensively publicize the superiority of the lower segment approach [Figure 1]. He is credited with changing practice away from the classical uterine incision. In Kerr’s own words, “I make no claims to originality as regards the incision, and I recommend it only because I believe that the cicatrix that results will be less liable to rupture” [16]. Of note was his ability to describe and publish his work so that his achievements quickly spread to all centers of education. However, credit for the transverse segment incision should be given to Robert Wallace Johnson who first suggested it as early as 1786 [17].

In Kerr’s own words: The patient is “placed in the Trendelenburg position. A longitudinal incision is made, reaching from below the umbilicus as far as the symphysis. After the abdomen is opened the bladder is dissected off the anterior uterine wall. A transverse incision is made in the lower uterine segment. A suture is inserted at each end of the wound; this is employed to control any laceration at the ends of the wound and after delivery to pull up the wound so that it can be easily stitched. The child is then expressed by passing a hand behind the uterus. Where this is not possible and the uterus has not been turned out of the abdomen, one blade of the forceps used as a vectis may be employed. Only once have I employed the two blades of the forceps. The child having been extracted and the cord tied, the placenta may be removed through the wound if the cervix is not sufficiently dilated, but if the cervix is sufficiently dilated I drop the cord into the uterine cavity and deliver the placenta by the vagina. I then pull up the wound so that it is within easy access for stitching by means of the two lateral stitches already referred to. I insert three layers of sutures, catgut for the mucous membrane, linen thread for muscle, and a third layer of catgut for tucking back the bladder into its old position” [16] [Figure 2].

John Martin Munro Kerr was born in 1868 at Glasgow and received his medical education in Glasgow, Dublin, Vienna, and Berlin. In 1900, he was appointed to the University of Glasgow, where he remained on the teaching staff for 40 years. He was particularly interested in the contracted female pelvis and its treatment options [18]. He may not have been satisfied with the Sanger operation, and therefore became convinced that the lower uterine segment would be the safest place of entry into the uterus. He was successful in combining the readily accessible entry into the peritoneal cavity followed by a transverse incision into the lower uterine segment. He noted there was much less hemorrhage, quicker convalescence, and lower incidence of abdominal adhesions [16,19]. He also noted that the risk for uterine rupture was low in subsequent pregnancies, negating the saying by Craigin of the early 1900s, “once a Cesarean, always a Cesarean” [20]. Physicians acquainted with both the

**Figure 2.** Reproductions of original figures from Kerr’s article [16].
Kerr procedure (transverse incision) and the Kronig operation (longitudinal incision) gradually became convinced that the former technique was preferable.

Canadian-born Louis Phaneuf, of Boston Massachusetts, wrote in 1931 that the transverse incision had three distinct advantages, namely that it avoided encroaching on the uterine musculature and allowed the placing of the incision entirely in the lower segment. Furthermore, the bladder separation did not have to be carried as far downward, and repeated operations were simpler to perform [21]. In 1926, Kerr added another improvement to his technique: a curved transverse incision in the uterus with the convexity directed downwards. The object of this line of incision was to lessen the risk of injuring the uterine vessels [19]. Phaneuf slightly modified Kerr’s transverse incision by recommending that the edges be curved upward (often referred to as the “smiley incision”) [19].

The brilliance of Munro Kerr was remarkable. He was a prolific writer; his renowned book, *Operative Midwifery*, later titled *Operative Obstetrics*, was first published in 1908, which was followed by many updated editions. He was frequently quoted in medical journals. His eminence as an obstetrician and gynecologist was recognized throughout the world. He was known as having great wit, charm, and humor, and was always approachable. Above all was his fame as a teacher [22,23].

Early on, Munro Kerr recognized that convincing other established schools to adopt the low transverse incision into the uterus was a tedious process. He stated that educating the obstetric communities had been a “slow business” [18]. In the absence of a decidedly contracted pelvis, he was also opposed to the doctrine “once a Cesarean always a Cesarean” [18], coined by Edwin Craigin in 1916 [20].

Due to Munro Kerr’s persistence that the low transverse Cesarean operation was superior to any of the other alternatives, it became, and continues to be, the accepted standard. Although the percentage of women undergoing Cesarean delivery varies dramatically worldwide, it is significantly above 30% in the United States and Brazil [24], making it one of the most common major operations. Women no longer need to feel in morbidity danger on being admitted to the hospital for the procedure. Other advancements include the liberal use of regional anesthesia, the routine use of prophylactic antibiotics, the availability of uterotonic agents, and improvements in suture material. The advent of spinal and epidural anesthesia permits the mother to avoid the inconvenience and complications (albeit, rare), associated with general anesthesia. The father is now encouraged to be beside his spouse and to be present during the birth process. Because of its simplicity, safety, and adaptability, the low transverse Cesarean section, as expounded on by Munro Kerr, is here to stay.

So that one does not conclude that Cesarean delivery should be preferred over vaginal delivery, it should be noted that vaginal delivery is superior to any type of Cesarean delivery in terms of maternal and fetal short- and long-term complications. In addition, Cesarean delivery remains a subject of extensive research and continues to undergo improvements such as the type of closure and sutures used as well as other prophylactic measures to decrease morbidity.

**References**