بسم الله الرحمن الرحيم

"سبحان الله حين تمسون و حين تصبحون، وله الحمد فى السموات و الأرض و عشيا و حين تظهرون، يخرج الحى من الميت و يخرج الميت من الحى ،و يحيى الأرض بعد موتها و كذلك تخرجون"

صدق الله العظيم

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TIMING OF PROPHYLACTIC ANTIBIOTIC ADMINISTRATION IN NON-LABORING PATIENTS WITH INTACT MEMBRANES UNDERGOING ELECTIVE CESAREAN DELIVERY

Thesis

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تحديد زمن اعطاء المضاد الحيوى فى المريضات الاتى يخضعن لعملية قيصرية ولا يعانين الام وضع أو انفجار فى جيب الماء

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ABSTRACT

The purpose of this study is to determine whether the timing of prophylactic antibiotics at cesarean delivery influences maternal/neonatal infectious morbidity and/or negatively impacts upon the neonatal course.

In this prospective randomized study, we studied the timing of prophylactic antibiotic in women undergoing elective cesarean section. Randomization of 480 women was carried out by a computer-based allocation of each study number to either skin incision group(A), or cord clamping group (B) .One gm ceftriaxone was given to patients with intact membranes undergoing elective cesarean section either at skin incision, group A, or at cord clamping, group B.

In the present study, we did not note a statistical difference between the two groups in rates of endometritis, ($P>0.05$), wound infection, ($P>0.05$) or other maternal or neonatal infectious morbidity.

KEY WORDS :- prophylactic antibiotics - cesarean delivery - maternal-neonatal - morbidity -

INTRODUCTION

The term cesarean delivery is defined as the delivery of a fetus through a surgical incision through the abdominal wall (laparotomy) and uterine wall (hysterotomy). The words cesarean and section both are derived from verbs that mean to cut; thus, the phrase cesarean section is a tautology. It is preferable to use the terms cesarean delivery or cesarean birth (Horley JMG, 1980).

In the United States, cesarean delivery has become the most common surgical procedure. By the early 1990s, almost 25% of all live births were from cesarean deliveries. In the last decade, acceptance has been growing for allowing women to have a vaginal delivery after having had a prior cesarean delivery (National Center for Health Statistics, 1993).

From 1910-1928, the cesarean delivery rate at Chicago Lying-in Hospital increased from 0.6% to 3%. In 1965, the cesarean delivery rate in the United States was 4.5%. In 1980, the cesarean delivery rate was 16.5%, and it peaked at 24.7% in 1988. Since then, the rate has decreased slightly and was 22.7% (949,000 procedures in 4.18 million births) in 1990 (National Center for Health Statistics, 1993).

The cesarean delivery rate also has increased throughout the world, but it still is substantially lower than that in America. In 1985, the cesarean delivery rate in America was 22.7%; this compares to 19% in Canada, 13% in Denmark, 10% in England, and 7% in Japan (Notzon et al, 1987).

Why the rate of cesarean delivery has increased so dramatically is not entirely clear. The following is a list of some of the reasons that may account for that increase:

- Repeat cesarean delivery: In 1988, when the cesarean delivery rate peaked at 24.7%, 36.3% (351,000) of all cesarean deliveries were repeat procedures. Reports concerning the safety of allowing vaginal birth after a cesarean delivery have been presented since the 1960s. Despite this, by 1987, less than 10% of women with a prior cesarean delivery were attempting a vaginal delivery.(Horley JMG, 1980_, National Center for Health Statistics, 1993, Notzon et al, 1987)
- Delay in childbirth and reduced parity: In the last 2 decades, an increase in the percentage of births to women older than 30, 35, and even 40 years has occurred. The risk of having a cesarean delivery is higher in nulliparous patients, and, with increasing maternal age, the risk for cesarean delivery is increased secondary to medical complications such as diabetes (including gestational) and preeclampsia.(Horley JMG, 1980_, National Center for Health Statistics, 1993, Notzon et al, 1987)
- Decrease in the rate of vaginal breech delivery: By 1985, almost 85% of all breech presentations (3% of term fetuses) were delivered by cesarean. At this time, the debate regarding the safety of a vaginal breech delivery is being investigated in a randomized controlled trial. (Horley JMG, 1980, National Center for Health Statistics, 1993, Notzon et al, 1987).
- Decreased perinatal mortality with cesarean delivery: This is an extremely complex issue to fully discuss in this setting. Perinatal outcome is greatly influenced by gestational age at delivery, by the presence of congenital abnormalities and growth abnormalities, and by the indication for delivery itself. Improvement in perinatal outcome has been greatly enhanced by improved technology

available to neonatologists and by improvements in prenatal care (eg, identification of patients at high risk, ultrasound, and increased usage of antenatal steroids in those at risk for preterm delivery). Unfortunately, despite the dramatic rise in the rate of cesarean delivery, the overall rate of cerebral palsy has not decreased dramatically. (Horley JMG, 1980, National Center for Health Statistics, 1993, Petitti DB, 1985).

- Nonreassuring fetal heart rate testing: More than 15% of all cesarean deliveries are for this indication. Again, although it is believed that a cesarean delivery for a fetus with an abnormal fetal heart rate pattern could be protected from future adverse problems, the overall rate of cerebral palsy has not decreased dramatically. At this time, the use of fetal pulse oximetry is gaining acceptance and may become more widely available. Fetal pulse oximetry is a useful aid in assessing fetal oxygen status and has been shown to decrease the need for cesarean delivery in the setting of a nonreassuring fetal heart rate pattern.(Steven G et al, 2004)
- Fear of malpractice litigation: Unfortunately, many obstetricians admit that their practice of medicine has become more defensive. Given the fear of inquiry regarding how a particular patient's labor was managed, many obstetricians may have a lower threshold to perform a cesarean delivery (Horley JMG, 1980) .

Women undergoing cesarean delivery have a significant incidence of many infectious complications, including fever, wound infection, endometritis, bacteremia, urinary tract infection, and pelvic abscess. (Chelmow et al, 2001). The frequency of cesarean section in the absence of labor or ruptured membranes is likely to continue to rise. Although these procedures are lower risk than cesarean delivery after labor,

complications such as wound infection, endometritis and postoperative fever do occur. (Chelmow et al, 2004). A central tenet in preventing surgical infections is to achieve adequate tissue antibiotic concentrations before any breach in the integument when prophylaxis is employed. On the other hand, if antibiotics are given before delivery of the infant and clamping of the cord ,many neonatologists fear that preexisting neonatal infections might be masked, or there might be an increased risk for development of resistant organisms.(Edwards et al , 2002). Thus accepted surgical practice of administrating prophylactic antibiotics before an operative procedure appears to be at odds with the neonatal perspective of delaying such antibiotic administration until after delivery and cord clamping. (Brad et al, 2005). The development of early-onset group B streptococcal neonatal sepsis significantly decreased as the use of antepartum antibiotics increased. Thus, the number of prevented infections from antepartum antibiotic use may still outweigh the problems that are seen when resistant bacterial infections arise. (Craig et al, 2002). In addition, it may take as long as 4 hours after maternal administration of many antibiotics to reach therapeutic levels in the neonate (Centers for Disease Control and Prevention, 2002). This would imply that a single dose of antibiotics just before skin incision would be unlikely to result in adequate antibiotic levels to significantly delay a diagnosis of neonatal sepsis. (Brad et al, 2005).

AIM OF THE STUDY

The purpose of this study is to determine whether the timing of prophylactic antibiotics at cesarean delivery influences maternal/neonatal infectious morbidity and/or negatively impacts upon the neonatal course.

HISTORY OF THE PROCEDURE

The exact origin of the term cesarean is unclear. The term cesarean may have arisen in the Middle Ages from the Latin verb caedere (to cut). Children of such births were referred to as caesones. The term also may originate with an eighth century BC Roman law, lex regis, Later called lex cesarea, this law mandated a postmortem operative delivery so that both the mother and child could be buried separately (Horley JMG, 1980, Thompson S., 1955).

Although many references to abdominal delivery are made in many cultures, many of the ancient medical writers (eg, Galen, Hippocrates, Soranus) do not describe such a procedure.(Thompson S.,1955).

In 1581, François Rousset wrote about cesarean deliveries. He describes 14 such procedures from information he received from letters, but he never actually witnessed such a procedure. By the mid 17th century, more reports by obstetricians about this operation began to appear. Early descriptions of such procedures reveal that abdominal delivery was performed in rare circumstances.(Young JH, 1944).

The ability of obstetricians to perform the procedure was limited by anesthesia and infection control. In 1846, the anesthetic agent diethyl ether was introduced at Massachusetts General Hospital. Queen Victoria delivered Leopold (1853) and Beatrice (1857) by cesarean delivery with the administration of chloroform. However, despite the increased potential for abdominal procedures provided by anesthesia, mortality from the procedure from infectious morbidity remained high following cesarean delivery (Young JH, 1944, Miller JM, 1992) .

Surgical technique also was a limiting factor for the acceptability of the procedure. Initially, maternal mortality from blood loss also was

high because surgeons were reluctant to close the uterine incision. Some advocated hysterectomy at the time of cesarean delivery to control bleeding and decrease infection. In 1882, Max Sanger, from Leipzig, described the value of suturing the uterine wall with silver wire (developed by 19th century gynecologist J. Marion Sims) and silk in a 2-step closure. His report documented the survival of 8 of 17 mothers delivered by American surgeons (Thompson S.,1955).

Although the introduction of internal sutures decreased hemorrhagic morbidity, infectious morbidity from peritonitis remained substantial. In 1907, the extraperitoneal approach was first described by Frank and modified in 1909 by Latzko. This approach appeared to decrease the risk of peritonitis, and, in 1912, Krönig described that this approach also allowed access to the thinner lower uterine segment. Krönig described a vertical median uterine incision with delivery aided by forceps. Then, the lower segment was covered with peritoneum (Thompson S.,1955, Young JH, 1944, Miller JM, 1992) .

This technique was modified further and introduced in the United States by Beck (1919) and DeLee (1922). Finally, in 1926, Kerr described a low transverse incision in the lower uterine segment, the most commonly used uterine incision throughout the world today. With the discovery of penicillin by Alexander Fleming in 1928 (purified in 1940), the need for an extraperitoneal procedure essentially was eliminated.(Thompson S.,1955, Young JH, 1944, Miller JM, 1992).

Indications for cesarean section;

A cesarean delivery is recommended to prevent maternal and/or fetal morbidity when a contraindication to allowing labor is present or when a completion of a vaginal delivery is anticipated to be unsafe or

lengthy. Some indications are for maternal benefit alone, some are for fetal benefit alone, and some are for both maternal and fetal benefit.(Horley JMG, 1980 , Larry C. Gilstrap, et al, 2002, American College of Obstetricians and Gynecologists. Guidelines for Perinatal Care,1997)

Maternal indications

Relatively few indications for a cesarean delivery solely benefit the mother. Women with an abdominal cerclage in place: Those mothers with an incompetent cervix in whom vaginal cervical cerclages have failed but who wish to have more children should have a cesarean delivery (Horley JMG, 1980_, Steven G et al ,2004, American College of Obstetricians and Gynecologists. Guidelines for Perinatal Care,1997).

Obstructive lesions in the lower genital tract: Cesarean delivery would be performed in the setting of obstructive lesions in the lower genital tract, including malignancies and large vulvovaginal condyloma (Horley , 1980, Steven G et al ,2004, American College of Obstetricians and Gynecologists Guidelines for Perinatal Care,1997).

Women with prior vaginal colporrhaphy and major anal involvement from inflammatory bowel disease: These patients would be candidates for an outright cesarean delivery (Horley JMG, 1980, American College of Obstetricians and Gynecologists. Guidelines for Perinatal Care, 1997).

Fetal indications

Fetal indications for cesarean delivery include those in which neonatal morbidity and mortality could be decreased by the prevention of trauma, infection, and prolonged acidemia. (Steven et al, 2004).

Malpresentation: A fetus in a nonvertex presentation is at increased risk for trauma, cord prolapse, and head entrapment.