Introduction

Cesarean section is an invasive surgical procedure in which a baby is delivered through an abdominal and uterine incision & carries with it many immediate and delayed morbidity and mortality risks ***(Althabe and Belizan, 2006)***. During the past few decades the worldwide incidence of cesarean births has increased markedly ***(Pinette et al., 2004)***. The high rate of cesarean section poses a unique threat in the developing world were family size has not dipped to the low levels seen recently in the more industrialized countries. Repeated cesarean deliveries are associated with increased morbidity ***(Waterstone et al., 2001).***

The increasing rate of cesarean sections could be accepted if it leads to an improved neonatal outcome. However, as any major surgery cesarean section has its own possible maternal consequences, so the total outcome maternal and neonatal should be well evaluated. Even if the safety of cesarean section was approved with no improvement of neonatal outcome cesarean section has to pass another evaluation concerning its economic impact including use of more medical resources, longer hospital stay and longer convalescence ***(U.S. National Institutes of Health, 2010).***

No doubt cesarean sections are an important &useful form of surgical intervention for difficult deliveries. However, rather than as a last resort, today patients & physicians elect to

use cesarean delivery for a variety of reasons ***(Menacker, 2005).*** Research indicates that a cesarean section rate of between 5 and 10 percent achieves the best outcomes for mothers & babies, and that rates above 15 percent do "more harm than good" ***(Usha Kiran and Jayawickrama, 2002).*** The World Health Organization (WHO) and the relevant united Nations agencies have called upon the medical community to reduce the cesarean rate to 15% or less ***(World Health Organization, 1985).***

This study reviews cesarean sections done at Ain Shams maternity hospital which represents a major national and regional referral center.

This helps to take a representative sample of all possible patient presentations. In addition being a teaching hospital guarantees the use of a respectable protocol of management away from individual practitioner attitudes.

Aim of the Work

This study reviews all cases delivered by cesarean section from 2007 to 2011 at Ain Shams Maternity Hospital.

History

Several references to abdominal delivery appear in between the 2nd and 6th centuries AD. There can be no doubt, however, that cesarean delivery in dead women was first practiced soon after the Christian church gained dominance, as a measure directed at baptism of the child. Confidence in the validity of some of these early reports in rudely shaken, however, when they glibly state that a living, robust child was obtained 8 to 24 hours after the death of the mother ***(Cunningham et al., 2005)***.

Francois Rousset introduced the concept of performing an operation upon the living woman in the 16th century. He suggested several obstetric complications that were more horrific than the operation itself in one example, the fetus had escaped into the abdominal cavity during labor later caused an abdominal abscess that was debilitating to the woman. Next, he sought to establish the feasibility of the operation by giving an account of seven females who survived, he reported that another successful pregnancy may follow the operation ***(Young, 1944)***.

This shows without doubt that the operation was employed on the living in rare and desperate cases, and that is was usually fatal ***(Cunningham et al., 2005)***.

Cesarean delivery maintained its high mortality rate until the beginning of the 20th century. In Great Britain and Ireland,

the maternal death rate from the operation in 1865 was 85 percent. In Paris, during the 90 years ending in 1876, not a single mother survived cesarean delivery. ***Harris (1879)*** noted that as late as 1879, cesarean deliveries actually were more successful when performed by the patient herself or when the abdomen was ripped open by the horns of a bull! He found nine such cases in the literature with five recoveries, and contrasted them with 12 cesarean deliveries performed in New York City during the same period with only one recovery.

The turning point in the evolution of cesarean operations came in 1882 when ***Max Sanger***, then 28-years-old assistant of ***Grade*** at Leipzig, introduced suturing of the uterine wall. The long neglect of so simple an expedient had not been from oversight, but stemmed from a deeply rooted belief that sutures in the uterus were superfluous, as well as harmful by virtue of serving as the site for severe infection. 17 cesarean deliveries had been reported in which silver wire sutures had been used with the survival of eight mothers an extraordinary record in those days. These, hemorrhage were the first and most serious problem to be solved ***(Eastman, 1982)***.

Although the introduction of uterine sutures reduced mortality from the operation from hemorrhage generalized peritonitis remained the dominant cause of death. Hence various types of operations were devised to combat this scourge. The earliest was the ***Porro*** procedure ***(1876)***, which combined subtotal cesarean hysterectomy with marsupialization of the cervical stump. The first extraperitoneal operation was

described by ***Frank in (1907)***, he opened peritoneal cavity just above the pubis and then sutured the parietal peritoneum to the visceral peritoneum at the point of vesicouterine reflection. This effectively sealed of the peritoneal cavity before opening the uterus through a vertical incision ***(Frank, 1907)***.

With various modifications this technique was introduced by ***Latzko (1909) and Waters (1940)***, and it was employed until recent years ***(Cunningham et al., 2004)***.

In ***(1912) Kronig*** contended that the main advantage of the extraperitoneal technique was that the uterine incision was covered by peritoneum to accomplish this, he cut through the vesical reflection of the peritoneum from one round ligament to the other and separated it and the bladder from the lower uterine segment. Then, through a vertical median incision, the child was extracted by forceps. The uterine incision was then closed and buried under the vesical peritoneum. With minor modifications, this low-segment technique was introduced into the United States by ***Bock (1919) and Dolee (1922)***.

In ***(1926) Munrokerr of Glasgow*** modified Kronig's technique and performed a downward curving transverse incision in the lower uterine segment ***(Kerr, 1926)***. This was modified by ***Pfaneuf (1931)*** into the present day upward curving low transverse uterine incision. It was not until 1949, however, at the twelfth British congress of obstetricians and gynaecologists, that Kerr finally noted general acceptance of his

procedure, the Kerr procedure now is the most popular type of cesarean section ***(O'Suullivan et al, 1981)***.

The subsequent developments since Kerr's time have been more subtle and the increased safety for the mother since then is related more to the improvements in anesthesia, infection control and blood transfusion technology ***(Cunningham et al., 2005)***.

Rate of Cesarean Section

Cesarean section rates have been increasing worldwide, and are a growing concern in many countries. Once limited to western countries, particularly the United States and United Kingdom, high rates of cesarean deliveries are now an international phenomenon, reflecting, in part, increased hospital-based delivery and access to healthcare ***(Lancet, 2000)***.

The rise of cesarean births have been the subject of continuing debate ***(Dosa, 2011)***. Although often a necessary or desirable procedure, cesarean delivery may also be medically unnecessary ***(De Muylder, 1993)***. Country-specific standards of practice, convenience of delivery, fear of being sued, and profitability may influence medical decision-making leading to greater intervention in delivery ***(Dosa, 2011)***.

Worldwide Trends in Cesarean Section Rates:

Most industrialized countries then had Cs rates of 10%-13%, the lowest in Japan (7%) and highest in Brazil where it rose from 30.3% in 1978-1979 to 50.8% in 1994 ***(Leung et al., 2001)***. Recent data indicated that cesarean delivery rate worldwide is 15% of births ***(Betran et al., 2007)***. Brazil, and Italy have the highest rate (over 35%) and Africa has the lowest (under 5%). The mean cesarean delivery rate in developed countries in 21.1 percent, but is only 2 percent in the least developed countries. In Brazil, the wealthiest 10 percent of

women have a cesarean delivery rate of 77 percent ***(Ronsmans et al., 2006)***.

Cs rates in several countries worldwide are shown in table (1).

Table (1): Examples of international cesarean section rates in year 2011.

Country	Cs rate (%)	Comment	Reference
Brazil	32	Out of all births	(Buckens et al. 2007)
	80	Hospital data	
Chile	40		(Buckens et al. 2007)
Japan	7		(Leung et al., 2005)
New Zealand	22.1		(New Zealand Health Information Service, 2007)
United Kingdom	20-24	Increases from 4% 30 years previously	(Reproductive health matters, 2007)
Sub-Saharan African	5		(Buekens et al. 2007)
United States of America	23.5		(Dosa, 2011)

There is a great disparity between country rates. However, extremely low Cs rates, such as <1%, may indicate substandard maternity care whereas for VBAC, if cases are not well-selected and carefully followed-up during labor, more scar dehiscence will result.

Cesarean Section Rates in Egypt:

A significant rise in cesarean deliveries occurred for all births; from a low of 4.6% in 1992 to 10.3% in 2000. This represents an overall increase of 130 percent in the cesarean delivery rate between 1987 and 2000. However, these trends might reflect the increase in hospital-based delivery in Egypt and concomitant decrease in home births. The corresponding cesarean rates for hospital-based deliveries were much higher than the overall rates, and also increased slightly from a low level of 15.3% (95% CI: 13.9-16.85) in the 1992 survey, to 18.5% (95% CI: 17.27-19.79) in the 1995 survey to 20.9% (95% CI: 19.87-22.05) in the survey, to a high of 26.2% in 2009 ***(Khawaja et al., 2012)***.

Lastly, the 2011 EDHS shows that more than one quarter of deliveries in the five-year period before the survey were by cesarean section and about 37% of urban births were cesarean deliveries compared to 22% of rural births ***(El-Zanaty and Associates, 2011)***. Although the cesarean section rate was slightly higher in private hospitals, the rate also increased consistently in public hospitals ***(Khawaja et al., 2012)***.

Table (2): Number and rate of cesarean deliveries for all births and for hospital births, Egypt 2000, 2005, 2010.

	1995-2000			2000-2005			2005-2010		
Cesarean section rate	**No. of births**	**(%)**	**95%Cl**	**No. of births**	**(%)**	**95%Cl**	**No. of births**	**(%)**	**95%Cl**
All births	8.692	(4.6)	(4.16-5.05)	1.1431	(6.7)	(6.21-7.13)	11.349	(10.3)	(9.74-0.87)
Hospital births	2.355	(18.3)	(13.90-16.85)	3.723	(18.5)	(17.27-19.79)	5.472	(20.9)	19.87-22.05)

Source: Egypt Demographic and Health Survey micro data 2000, 2005, 2010 ***(El-Zanaty et al., 2001, 2006, 2011)***.

During the 1995-1996 period, the rates in public and private hospitals were basically the same at respectively, 14.0% (95% CI: 10.37-18.35) and 13.6% (95% CI: 8.71-19.84) ***(Khawaja et al., 2012)***.

Despite this difference, the rates increased consistently for both public and private hospitals over the years, especially from the late 1980s until the first half of the 1990s. for public hospitals cesarean section rates increased from 12.2% (95% CI: 9.66-15.05) in 1999-2000 to a high of 20.8% (95% CI: 18.04-23.77) in 2009-2010, the corresponding rates for private hospitals were 16.0% (95% CI: 12.18-20.54) and 23.2% (95% CI: 20.42-26.09) ***(Khawaja et al., 2012)***.

Indications of Cesarean Section

A few indications for cesarean section are absolute considering that delivery by another method would be extremely dangerous for example gross disproportion or placenta previa. However, in most cases the indications are relative and cesarean section is performed when it is thought that the potential maternal and fetal risks could be reduced by cesarean section. The indications of cesarean section include:

Faults in the birth canal (Apuzzio et al., 2006):

- ***Previous cesarean delivery:*** for patients who are not candidates for trial of labor, e.g., previous two sections or previous classical cesarean section and hysterotomy (secondary to myomectomy or uterine surgery, etc.).
- ***Cephalo-pelvic disproportion:*** gross obstruction to delivery from pelvic contraction will obviously justify cesarean section.
- ***Maternal infection:***
  - Section is recommended if there is an active herpetic lesion in maternal genital tract if the membranes are intact or within 4 hours of its rupture.
  - HIV-positive women with viral loads above 1000 copies/ ml should be offered planned cesarean section because it decreases the risk of neonatal infection ***(Riley & Greene, 1999 and American College of Obstetricians Gynecologists, 2000)***.

- Cesarean section is associated with a reduced risk of HCV transmission in women who are HCV/HIV coinfected ***(Thomas et al., 1998)***.

⊙ ***Mechanical obstruction to vaginal birth:*** such as large myoma or condyloma acuminate.

⊙ ***After successful genital repair:*** The exceptions are repairs close to the introitus which may be protected by episiotomy.

⊙ ***Women with an abdominal cerclage in place.***

⊙ ***Invasive carcinoma of the cervix.***

Malpresentations (Cunningham et al., 2005):

Breech presentation:

Complete or footling breech presentation is considered an indication for cesarean section, due to increased risk of cord prolapse. Similarly, a "stargazing" fetus, with a hyperextended neck, is also considered an indication for cesarean section due to the risk of cervical spinal injury.

Transverse lie:

⊙ Requires cesarean section unless converts or is converted late in pregnancy.

⊙ Surgeon may be able to rotate the fetus through the wall of the uterus once abdominal wall has been opened.

Occipito-Posterior position:

Cesarean section is performed in cases of persistent, oblique occipito-posterior or deep transverse arrest.

Face presentations:

- With adequate pelvis rotation of the head to the mento-anterior position, should achieve vaginal delivery after a long labor.
- Backwards rotation of the head to a mento-posterior position requires a cesarean section.

Brow positions:

- Brow presentation is usually only diagnosed once labor is well established.
- It does not indicate immediate operative delivery because there is often spontaneous conversion to an occiput or face presentation; a cesarean section is required if the brow presentation persists ***(Apuzzio et al., 2006)***.

Dystocia:

It refers to failure of progress whatever the aetiology. Some form of dystocia is the most frequent indication for cesarean section in the United States ***(Cunningham et al., 2005)***.

Antepartum haemorrhage (Apuzzio et al., 2006):

- Patients with total placenta previa must always be delivered by section, even if the fetus is dead. Low laying placenta previa is considered by many as an indication for section.
- Abruptio placentae are an absolute indication for section if the hemorrhage is severe and the fetus is not immediately deliverable.

Maternal disorders (Apuzzio et al., 2006):

- Gestational hypertensive disease, preeclampsia and eclampsia are relative maternal indication for section depending upon severity of the disease and how soon delivery must occur.
- Maternal cardiac disease is not an absolute indication for cesarean section. The stress of major surgery should not be superimposed upon a failing or potentially failing heart. The goal for these patients is a short second stage, with minimal Bearing down.
- Cerebral haemorrhage or an aneurysm because any second-stage bearing-down effort is usually contraindicated.
- For cases of respiratory disease, and indeed most intercurrent medical disorders, assisted vaginal delivery is preferable to cesarean section unless there is some obstetric impediment to easy delivery.