

Lower Segment Caesarean Section Audit Is a Promising Tool to Improve the Quality of a Standard Care at a Tertiary Hospital in Kuwait “Cross-Section Study”

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Abstract

Aim: Clinical audit is a tool to improve quality of care and to reduce maternal and perinatal morbidity and mortality. Auditing the CS according to a standard parameter will lead to strategies to avoid unnecessary intervention and to advice uniform practice. The aim was to evaluate the current practice and audit against international standards for various parameters relating to elective lower segment caesarean section and to assess compliance of physicians to audit standards. **Subject and methods:** This is a cross-sectional study which was in a tertiary hospital in Kuwait from 1st October 2019 until 1st October 2020. The hospital medical, electronic records and case notes of three hundred and twenty-six (326) cases of elective caesarean sections were reviewed for study participants. Those women were booked under the care of internal and external physicians. Demographic data and primary outcomes were collected. **Results:** Outcome was measuring the compliance to the recognized Caesarean Section international standards: consent form, grade of LSCS, antacid and anti-emetics, type of anesthesia, uses of antibiotics, umbilical cord blood PH, and thromboprophylaxis. The compliance for a signed consent form and cord blood PH was (100%), the use of preoperative antacid and antiemetic was (99.4%), combined regional anesthesia was given in (53.4%) of cases, preoperative antibiotics prophylaxis of second generation cephalosporin was to (61.3%) of cases, post-operative thromboprophylaxis was given in (78.5%) of cases of which (33.6%) completed a 10 days duration. There was a statistically significant difference between internal and external physicians' compliance regarding, type of anesthesia 2.3 (95% CI, 1.3 - 4.1, p

= 0.004), type and timing of antibiotics 0.42 (95% CI 0.22 - 0.79, $p = 0.007$) and 0.33 (95% CI 0.172 - 0.63, $p = 0.0006$) and thromboprophylaxis 8.1 (95% CI 2.80 - 23.23, $p = 0.000$). **Conclusion:** The results are encouraging, but suboptimal compliance is noticed mainly among external physicians.

Keywords

Audit, Quality, Lower Segment Caesarean Section, Tertiary Hospital, Kuwait

1. Background

Caesarean section has become a common major surgery in the practice of modern obstetrics with a considerable risk and a wide variety of morbidity. Clinical audit is a tool to improve quality of care and to reduce maternal and perinatal morbidity and mortality [1]. Audit plays an important role in the analysis of changing trends in caesarean delivery to be a more standardized procedure. The World Health Organization (WHO) recommends a rate of LSCS to be (5% - 15%) of all deliveries for any community and above which is considered unnecessary overuse of this procedure [2]. Medically justified caesarean section can effectively prevent maternal and perinatal mortality and morbidity. Caesarean section complications include [1] [2]: Infection, hemorrhage, complication of anesthesia, bladder injury, prolonged hospital stay and delayed recovery. In addition, caesarean delivery is associated with considerable costs for patients and hospitals, resulting in a longer hospital stay [3] [4] [5] [6]. A Standardized practice in the preoperative, intraoperative, and postoperative stages of caesarean section might help in reduction great part of untoward sequels of caesarean delivery. This can be done through implementing and auditing clear pathway for the procedure [4]. This cross-sectional study aims to assess the compliance to caesarean section pathway and its implications on the outcome of the procedure.

2. Methods

A cross sectional study was conducted at a large private hospital in Gulf accredited by Joint Commission International and Accreditation Canada International with around 2000 deliveries per annum. To maintain standards of care as per the established guidelines, audit of key interventions like elective lower segment caesarean section is done as part of our regular review cycle through the hospital Quality Systems Management Department. There is a practice guideline and pathway for caesarean section as required by JCI to ensure consistency of quality of care experienced by women undergoing caesarean section.

Medical files of all deliveries during period from 1 October 2019 until 1 October 2020 were reviewed. Eligible cases were recruited through ICD-10-CM (International Classification of Disease, Tenth Revision, and Clinical Modification).

Administrative approval: This study has the approval of medical director of office as per local policy for such audit and publication.

Inclusion criteria: Elective caesarean sections.

Exclusion criteria: Normal vaginal deliveries and emergency caesarean sections.

Sample size: (326 out of 2296 files) were following inclusion criteria.

These files were reviewed to check if they followed the audit standards, which considered as gold standards by RCOG guidelines, NICE guidelines and from the Kuwait Ministry of Health guideline.

The audit criteria were documented consent, grade of lower segment caesarean section, anti-emetic and antacid prophylaxis, antibiotic prophylaxis, type of antibiotic used and time of its administration, thromboprophylaxis, type of anesthesia and umbilical cord blood PH.

Statistical analysis: Data were analyzed using the Statistical Package of Social Science (SPSS) program for Windows (Standard version 20). The normality of data was first tested with one-sample Kolmogorov-Smirnov test. Qualitative data were described using number and percent. Association between categorical variables was tested using Chi-square test while Fischer exact test was used when expected cell count less than 5. Continuous variables were presented as mean \pm SD (standard deviation) for parametric data. Epi info 7 was used to calculate OR, odds ratio and 95%CI, confidence interval. The results were considered Significant when P-value \leq 0.05.

3. Results

The total number of deliveries was 2296 cases out of which there were 326 cases of elective caesarean sections done. Regarding demographic data of studied population, mean age was (31.4 \pm 4.9) years. Caesarean sections were done at gestational age equal or more than 38 weeks (49.7%) (Table 1). Elective cesarean section was about (14.2%) (Figure 1). Most common cause of LSCS was due to previous LSCS (64.4%) (Figure 2).

Table 1. Demographics of studied population.

Variables	Study group (n = 326)	
	Mean \pm SD	Min-Max
Age (years)	31.45 \pm 4.967	21 - 46
weight (kg)	85.19 \pm 14.222	55 - 127
Length of hospital stay (days)	2.83 \pm 0.832	2 - 7
Cord PH	7.29 \pm 0.055	7.08 - 7.43
	No (326)	%
Parity:		
PG	70	21.5
P1 - 2	158	48.5
>P2	98	30.0
Gestational age		
• Less than 38 weeks	164	50.3
• Equal or more than 38 weeks	162	49.7

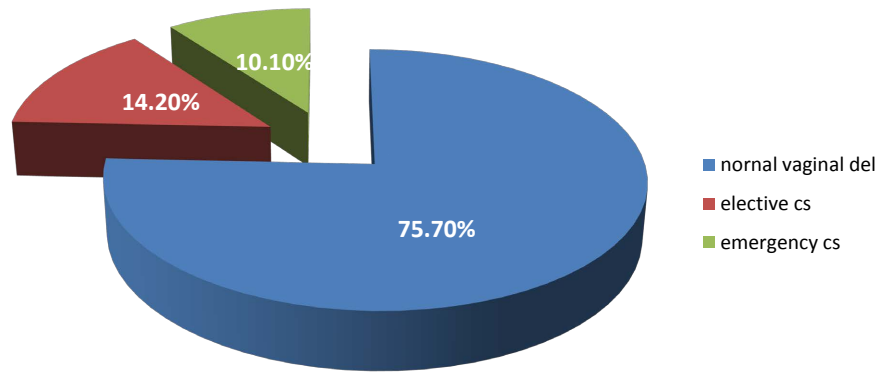


Figure 1. Pie chart diagram showing types of deliveries at New Mowasat Hospital.

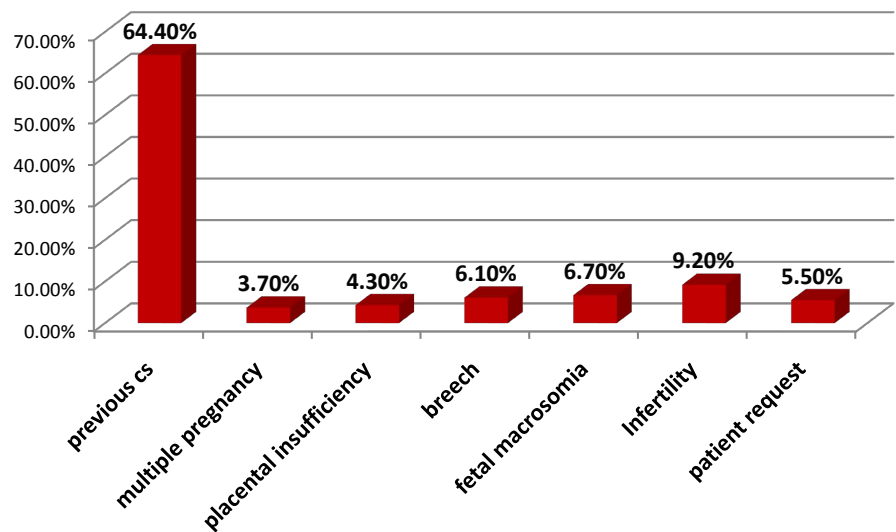


Figure 2. Bar chart showing the frequent causes of LSCS at New Mowasat Hospital.

In terms of auditable standards, total number of the studied sample was (326/326) women, (100%) of them signed the documenting consent form with appropriated grading of LSCS and were tested for cord blood PH. preoperative antacid and antiemetic 324 (99.4%) and thromboprophylaxis was given in 256 (78.5%), but those who completed a ten days' duration 86 (33.6%). A second-generation cephalosporin used in 200 (61.3%), however it was given before 60 mints of skin incision in 128 (39.3%). A combined regional anesthesia was given in 174 (53.4%) (Table 2).

There was statistically a significant difference between internal and external physicians regarding compliance to some LSCS audit standards. Internal physicians were more compliant than external physicians in giving combined regional anesthesia OR = 2.3 (95% CI, 1.3 - 4.1, p = 0.004) and in giving thromboprophylaxis for 10 days OR = 8.1 (95% CI 2.80 - 23.23, p = 0.000) but external physicians were more compliant than internal physicians in giving 2nd generation cephalosporin antibiotics OR = 0.42 (95% CI 0.22 - 0.79, p = 0.007) before 60 mint of skin incision OR = 0.33 (95% CI 0.172 - 0.63, p = 0.0006) (Table 3).

Table 2. Compliance to the auditable standards.

Variables	Study group (n = 326)	
	No	%
Consent Complete	326	100
Grad 4 urgency	326	100
Testing Cord PH	326	100
Anesthesia:		
Type		
• general	152	46.6
• combined regional	174	53.4
Antibiotics:		
Type		
• 2nd generation cephalosporin	200	61.3
• Others (Curam or Flagel)	126	38.7
Duration		
• Before 60 mint of skin incision	128	39.3
• Within 60 mint of skin incision	150	46.0
• After 60 mint of skin incision	48	14.7
Thrombi prophylaxis:		
Given:		
• Yes	256	78.5
• No	70	21.5
Duration: (N = 256)		
• For 10 days	86	33.6
• Less than10 days	170	66.4
Taking antacids		
• Yes	324	99.4
• No	2	0.6
Taking antiemetic		
• Yes	324	99.4
• No	2	0.6

Table 3. Relation between type of physicians and adherence to the audit standards.

Variables	Internal (n = 266)		External (n = 60)		COR (95% CI)	p-value
	N	%	N	%		
Anesthesia:						
Type						
- General	114	42.9	38	63.3	2.3 (1.3 - 4.1)	0.004**
- combined regional	152	57.1	22	36.7		
Antibiotics:						
Type						
- 2nd generation cephalosporin	154	57.9	46	76.7	0.42 (0.22 - 0.79)	0.007*
- Others (Curam or Flagel)	112	42.1	14	23.3		

Continued

<u>Duration</u>						
- Before 60 mint of skin incision	94	35.3	34	56.7	0.33 (0.172 - 0.63)	0.0006**
- Within 60 mint of skin incision	134	50.4	16	26.7		
<hr/>						
- Before 60 mint of skin incision	94	35.3	34	56.7	0.72 (0.33 - 1.62)	0.434
- After 60 mint of skin incision	38	14.3	10	16.7		
<hr/>						
Taking antacids						
● Yes	264	99.2	60	100	UD	1.000
● No	2	0.8	0	0		
<hr/>						
Taking antiemetic						
● Yes	264	99.2	60	100	UD	1.000
● No	2	0.8	0	0		
<hr/>						
Thrombiprophylaxis:						
Given:						
● Yes	204	76.7	52	86.7	0.51 (0.23 - 1.12)	0.089
● No	62	23.3	8	13.3		
<hr/>						
	N = 204	%	N = 52	%		
<hr/>						
Duration: (N = 256)						
● For 10 days	82	40.2	4	7.7	8.1 (2.80 - 23.23)	0.000**
● Less than10 days	122	59.8	48	92.3		

CI: Confidence Interval; OR: odd ratio; *: Statistically significant; **: Highly statistically significant; UD: undefined.

4. Discussion

4.1. Main Findings

There is a professional concern about the increasing rate of caesarean section. Clinical audit is a quality improvement process that seeks to improve patient care and outcomes through systematic review of care against explicit criteria and the implementation of change. Aspects of the structure, processes and outcomes of care are selected and systematically evaluated against explicit criteria [3] [4].

LSCS rate reported high in developed countries. In United States, the rate of LSCS was reported 31.1%, which may be a consequent to increased advance in fetal monitoring regarding the presumed intra partum fetal comprise [5]. In addition, the Middle East area still is having a higher rate of LSCS, and Iran had recorded a high rate of LSCS 48% [7]. Despite deficiency in fetal monitoring facilities along with high level of litigation, this could push the physician to rush for caesarean delivery and the private practice is considered to be a window to the increased rates of the caesarean section worldwide. Conversely, in our institution the total delivery load was 2296 a year, 75.7% of those deliveries were vaginal deliveries, followed by 14.2% elective caesarean section and 10% emergency caesarean section which comes within the WHO recommended range 5% - 15% for an elective caesarean section [6].

In terms of elective cases, we started to audit them to highlight how our local practice is close to the recognized international standards. Our auditable stan-

dards include:

1) Antacid and anti-emetics prophylaxis: should be administered prior to general or regional anesthesia to reduce the gastric volume, acidity, and the risk of aspiration pneumonia [8] [9] [10] [11]. We achieved 99.4% compliance against 100% of the auditable standard.

2) Umbilical cord blood PH: should be performed after all elective or emergent LSCS or suspected fetal compromise, to allow review of fetal wellbeing and guide ongoing care of the baby [10]. We achieved 100% compliance against 100% of the auditable standard.

3) Thromboprophylaxis: A LSCS is a major factor for thromboembolic disease. The RCOG proposed a risk assessment profile for thrombosis and that prophylaxis should be based on that assessment. Women having a LSCS should be offered thromboprophylaxis for 10 days because they are at increased risk of venous thromboembolism up to 4 folds during postpartum period (4 - 6 in 10,000) [8] [12] [13] the overall achievement was 78.5%, but we met the criteria of 10 days' duration in 33.6% of cases.

4) Type of anesthesia: Women who are having a LSCS should be offered regional anesthesia because it is safer, earlier recovery and results in less maternal and neonatal morbidity than general anesthesia [12]. The overall achievement was 53.4% of cases received regional and 46.6% of cases received general anesthesia. Against auditable standard 95% of grade 4 LSCS should be under regional anesthesia [14].

5) Type and timing of antibiotics: Women should receive a prophylactic antibiotic at LSCS before the skin incision; to reduce the risk of maternal infection with no effect on the baby has been demonstrate [12]. Antibiotics should be effective against endometritis, urinary tract, and wound infections, such as second-generation cephalosporin (co-amoxiclavate not recommended before skin incision [9]-[16]. A second-generation cephalosporin, as recommended per guideline, was received in 61.3% of cases. Additionally, it should be given before the skin incision to reduce the risk of surgical site infection that was done only in 39.3% of cases and within 60 minutes of skin incision in 46% of cases.

4.2. Strength and Limitations

The institution has an approved policy by JCI for caesarean section, which should be followed by all physicians practicing at our hospital. Presence of medical records system which is the safest, economic, and simple way used to analyze cesarean sections. Regular auditing of the overall health services, process, and structure, along with appraising the health professions will grant a safe standard practice.

However, the limitations of our audit process, that we are challenged by having external physicians who had their own convenience based on their experience. As a private hospital, we should maintain our revenue in a line with international standards. Consequently, the rate of postoperative complications like

wound infection, readmission and thromboembolic complications was difficult to track because of the small number of sample size and most of complicated cases directed to Ministry of Health hospitals.

4.3. Interpretation

In this study 50.3% of patients undergone LSCS at a gestational age less than 38 weeks and 49.6% at more than 38 weeks. Prim gravida women contribute largely to a caesarean decision. There are social reasons related to local community, the patients tend to specify their date of delivery especially in private hospitals. Therefore, we are in need to work more on patient education through patient information leaflets.

Suboptimal achievement in type and timing of prophylactic antibiotic is due to some of physicians still are having a concern of trans-placental transmission and acquired antimicrobial resistance. Regarding shortage of thromboprophylaxis duration may be due to the long-standing old practice of some physicians who believe that thromboprophylaxis should be given during hospitalization period only, along with carrying a risk of bleeding. Misbelieves and community narratives still discourage the pregnant women to have a regional anesthesia during their deliveries. Additionally, reluctance to compliance to the recommended audit standards due to:

- External doctors cannot be enforced to change their practice.
- Resistance to the change among the local professionals or in organizational environment or team.
- Patient they may have preferences in care that make the implementation difficult.

Based on the audit results, the suggested plan to improve the clinical performance all through caesarean pathway is recommended.

4.4. Recommendation and Area of Improvement

- Standardization of practice among all physicians.
- Guideline's activation & Reinforcement of the policy.
- Education of the staff, profession, patients.
- A re-audit to be undertaken after 1 year is planned. A multidisciplinary approach with involvement of all stakeholders including the consumers, local audit department and obstetrics and gynecology department will be the way forward to achieve the change.

5. Conclusion

These results are encouraging in many areas which yet highlight the need of improvement in others like timing of antibiotics, use of regional anesthesia and duration of thromboprophylaxis as an identified substandard care factor. Our study findings suggest that CS audit is a very useful tool and, if well implemented, can improve the quality of care, patients' satisfaction, and harmonize

practice among care providers.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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List of Abbreviation

Lower segment caesarean section (LSCS)