Indication of cesarean section in primigravida according to Robson classification

Safwat AbdelradyMohamed, Fatma Ahmed Shehata Hussien, Ahmed Ali Abdelaleem

Department of Obstetrics and Gynecology, Women's Health Hospital, Faculty of Medicine, Assiut University, Assiut, Egypt

Correspondence to Ahmed Ali Abdelaleem, Assistant Professor, Department of Obstetric and Gynecology, Assiut University Hospital, Assiut, Egypt
Tel: +201001085865;
e-mail: aboaliabdelaleem@gmail.com

Background
A lot of primigravida go to unneeded caesarean section. The authors want to highlight its indications in primigravidae according to Robson's classification.

Methods
This prospective observational study was carried out on 518 patients in 2019 and 366 patients in 2020 who were nulliparous, single foetus, more than or equal 37 weeks, passed into spontaneous labour and received induction of labour after their admission to Assiut Woman's Health University Hospital, Assiut, Egypt.

Results
Residence in rural areas, education and placenta previa were significantly higher in 2019 compared with 2020 while residence in urban areas and intrauterine growth restriction were significantly lower in 2019 compared with 2020. Failure of progress in delivery in Robson group 1 was significantly lower in 2019 than in 2020. Intrauterine growth restriction in Robson group 2 was significantly lower in 2019 than in 2020.

Conclusions
The authors can use this classification to analyze the caesarean section rate in low resources hospitals.

Keywords:
caesarian section, primigravida, Robson criteria

Introduction

In 1985, The WHO stated; (there is no justification for any region to have a caesarean section rate higher than 10–15%). There is no strong evidence about benefits from increasing caesarean section (CS) rates, and some studies showing that increase rate to improve maternal and foetal outcome, CS still increasing worldwide [1].

In 2011, a systematic review of the categorization for CS refers to Robson's 10-group classification, as a good system to help as to understand our case [2].

Robson classify pregnant ladies using their obstetric history (parity, previous CS, gestational age, onset of labour, foetal presentation and number of foetuses) without involve the indication for CS [3].

Once patient reach hospital for delivery can be categorized using our Robson criteria. If we using on a continuous basis, we can provide a useful assessment of all practice at delivery and plan for future for low and high income countries [4].

Patients and methods

This prospective observational study was carried out on 518 patients in 2019 and 366 patients in 2020 who were nulliparous, single foetus, more than or equal 37 weeks, passed into spontaneous labour and received induction of labour after their admission to Assiut Woman's Health University Hospital, Assiut, Egypt. An informed written consent was given by all patients. Starting with history taking, last menstrual period (LMP), clinical examination, abdominal ultrasonography for determination of the date of delivery, labour and delivery data [the referral level (primary care, secondary care, home/community, private sector), number of neonates delivered, onset of labour, indications and methods of induction of labour if labour was induced], maternal indication [failed induction, failure of progress, preeclampsia and eclampsia, maternal diabetes, cephalon-pelvic disproportion, obstructed labour, on patient request, infertility, intracytoplasmic sperm injection (ICSI), placenta previa and maternal cardiac] and foetal indication [foetal deceleration, non-reassuring cardiotocography (CTG), foetal macrosomia, Intrauterine growth restriction (IUGR), non-lethal anomaly, genital herpes, meconium stained

and braw or face presentation].We have ethical approval IRB no 17101059.

Statistical analysis

All completed data were analyzed using SPSS V.23. The Robson group was assigned based on four obstetric concepts (with their parameters)—category of the pregnancy, previous obstetric history, course of labour and gestational age. Results were presented as frequencies and percentages. The caesarean delivery rate in each Robson group was calculated by dividing the number of caesarean deliveries in each group by the total number of deliveries within the group. A two tailed P value less than 0.05 was considered significant.

Results

Residence in rural areas, education and placenta

Table 1 Demographic characteristics, onset of labour, maternal caesarean and foetal caesarean delivery indications of all deliveries from January 2019 and December 2020 audits

Items	Group		P
	2019 year (n=518), n (%)	2020 year (n=366), n (%)	
Age			
<20	83 (16.6)	61 (17.4)	0.772
20–34	377 (75.6)	266 (76.0)	
≥35	39 (7.8)	23 (6.6)	
Gestational age at termination			
37–38 weeks	286 (57.3)	221 (63.1)	0.088
≥39 weeks	213 (42.7)	129 (36.9)	
Number of abortion			
0	420 (84.2)	304 (86.9)	0.276
≥1	79 (15.8)	46 (13.1)	
Residence			
Urban	300 (60.1)	323 (92.3)	<0.001*
Rural	199 (39.9)	27 (7.7)	
Work			
Work	211 (42.3)	162 (46.3)	0.248
Housewife	288 (57.7)	188 (53.7)	
Education			
Illiterate	140 (28.1)	69 (19.7)	0.027*
Primary	87 (17.4)	77 (22.0)	
Secondary	168 (33.7)	116 (33.1)	
High	104 (20.8)	87 (24.9)	
Onset of labour			
Spontaneous labour	150 (28.9)	122 (33.3)	0.240
Induced labour	109 (21.0)	64 (17.4)	
Not in labour	240 (46.3)	163 (44.5)	
Nulliparous, single breech	19 (3.6)	17 (4.6)	0.845
Failed induction	44 (8.5)	25 (6.8)	0.379
Failure of progress	53 (10.2)	42 (11.4)	0.553
Preeclampsia and eclampsia	83 (16.0)	69 (18.8)	0.228
Maternal diabetes	6 (1.2)	8 (2.2)	0.225
Obstructed labour	29 (5.6)	21 (5.7)	0.811
On patient request	74 (14.3)	50 (13.6)	0.880
Infertility	10 (1.9)	6 (1.6)	0.838
ICSI	11 (2.1)	2 (0.5)	0.136
Placenta previa	14 (2.7)	3 (0.8)	0.050
Maternal cardiac	6 (1.2)	3 (0.8)	0.743
Foetal deceleration	37 (7.1)	25 (6.8)	0.757
Non-reassuring CTG	40 (7.7)	42 (11.4)	0.071
Foetal macrosomia	32 (6.2)	22 (6.0)	0.940
IUGR	8 (1.5)	21 (5.7)	0.001*
Non-lethal anomaly	1 (0.2)	1 (0.3)	0.655
Genital herpes	2 (0.4)	0 (0.0)	0.588
Brow or face presentation	2 (0.4)	4 (1.1)	0.236

Data are presented as frequency (%). CTG, cardiotocography; ICSI, intracytoplasmic sperm injection, IUGR: intrauterine growth restriction.
*P is significant if <0.05.

previa were significantly higher in 2019 compared to 2020 while residence in urban areas and IUGR were significantly lower in 2019 compared to 2020. Age, gestational age at termination, number of abortions, work, onset of labour, nulliparous, single breech, failed induction, failure of progress, preeclampsia and eclampsia, maternal diabetes, obstructed labour, on patient request, infertility, ICSI, maternal cardiac, foetal deceleration, non-reassuring CTG, foetal macrosomia, non-lethal anomaly, genital herpes and brow or face presentation were insignificant between the two groups Table 1.

Table 2 shows maternal and foetal indications for CS within Robson group in an Assiut University Hospital 2019–2020 Table 2.

Failure of progress in delivery in Robson group 1 was significantly lower in 2019 than in 2020. Preeclampsia and eclampsia, obstructed labour, on patient request and maternal cardiac were insignificant between 2019 and 2020. Failed induction, failure of progress, preeclampsia and eclampsia, maternal diabetes, obstructed labour, on patient request, infertility, ICSI, placenta previa and maternal cardiac in Robson group 2 and Robson group 6 were insignificant between 2019 and 2020 Table 3.

IUGR in Robson group 2 was significantly lower in 2019 than in 2020. Foetal deceleration, non-reassuring CTG, foetal macrosomia and non-lethal anomaly were insignificant between 2019 and 2020. Foetal deceleration, non-reassuring CTG, foetal macrosomia, IUGR, non-lethal anomaly, genital herpes and brow or

Table 2 Maternal and foetal indications for CS within Robson group in an Assiut University Hospital 2019–2020

Variables	Group		
	Robson group 1, *n* (%)	Robson group 2, *n* (%)	Robson group 6, *n* (%)
Maternal indications 2019			
Failed induction	0	44 (12.6)	0
Failure of progress	13 (8.7)	39 (11.2)	1 (5.3)
Preeclampsia and eclampsia	4 (2.7)	77 (22.1)	2 (10.5)
Maternal diabetes	0	5 (1.4)	1 (5.3)
Obstructed labour	13 (8.7)	15 (4.3)	1 (5.3)
On patient request	4 (2.7)	68 (19.5)	2 (10.5)
Infertility	0	8 (2.3)	2 (10.5)
ICSI	0	9 (2.6)	2 (10.5)
Placenta Previa	0	14 (4.0)	0
Maternal cardiac	1 (0.7)	5 (1.4)	0
Maternal indications 2020			
Failed induction	0	25 (11.0)	0
Failure of progress	22 (18.0)	19 (8.3)	1 (5.9)
Preeclampsia and eclampsia	6 (4.9)	62 (27.2)	1 (5.9)
Maternal diabetes	0	7 (3.1)	1 (5.9)
Obstructed labour	9 (7.4)	12 (5.3)	0
On patient request	5 (4.1)	44 (19.3)	1 (5.9)
Infertility	0	5 (2.2)	1 (5.9)
ICSI	0	2 (0.9)	0
Placenta previa	0	3 (1.3)	0
Maternal cardiac	0	3 (1.3)	0
Foetal indications 2019			
Foetal deceleration	24 (16.0)	13 (3.7)	0
Non-reassuring CTG	31 (20.7)	9 (2.6)	0
Foetal macrosomia	4 (2.7)	28 (8.0)	0
IUGR	1 (0.7)	7 (2.0)	0
Non-lethal anomaly	0	1 (0.3)	0
Genital herpes	1 (0.7)	0	1 (5.6)
Brow or face presentation	2 (1.3)	0	0
Foetal indications 2020			
Foetal deceleration	18 (14.8)	6 (2.6)	1 (5.9)
Non-reassuring CTG	31 (25.4)	10 (4.4)	1 (5.9)
Foetal macrosomia	4 (3.3)	18 (7.9)	0
IUGR	1 (0.8)	17 (7.5)	3 (17.6)
Non-lethal anomaly	0	1 (0.4)	0
Genital herpes	0	0	0
Brow or face presentation	4 (3.3)	0 (0.0)	0

Data are presented as frequency (%). CS, caesarean section; CTG, cardiotocography; ICSI, intracytoplasmic sperm injection; IUGR, intrauterine growth restriction.

Table 3 Maternal caesarean delivery indications in the Robson group 1, Robson group 2 and Robson group 6 (2019–2020)

Items	2019 year, n (%)	2020 year, n (%)	P
Robson group 1			
Failed induction	0	0	
Failure of progress	13 (8.7)	22 (18.0)	0.022*
Preeclampsia and eclampsia	4 (2.7)	6 (4.9)	0.353
Maternal diabetes	0	0	
Obstructed labour	13 (8.7)	9 (7.4)	0.698
On patient request	4 (2.7)	5 (4.1)	0.736
Infertility	0	0	
ICSI	0	0	
Placenta previa	0	0	
Maternal cardiac	1 (0.7)	0	0.551
Robson group 2			
Failed induction	44 (12.6)	25 (11.0)	0.552
Failure of progress	39 (11.2)	19 (8.3)	0.269
Preeclampsia and eclampsia	77 (22.1)	62 (27.2)	0.159
Maternal diabetes	5 (1.4)	7 (3.1)	0.178
Obstructed labour	15 (4.3)	12 (5.3)	0.591
On patient request	68 (19.5)	44 (19.3)	0.956
Infertility	8 (2.3)	5 (2.2)	0.937
ICSI	9 (2.6)	2 (0.9)	0.144
Placenta Previa	14 (4.0)	3 (1.3)	0.078
Maternal cardiac	5 (1.4)	3 (1.3)	0.606
Robson group 6			
Failed induction	0	0	
Failure of progress	1 (5.3)	1 (5.9)	0.935
Preeclampsia and eclampsia	2 (10.5)	1 (5.9)	0.615
Maternal diabetes	1 (5.3)	1 (5.9)	0.935
Obstructed labour	1 (5.3)	0	0.337
On patient request	2 (10.5)	1 (5.9)	0.615
Infertility	2 (10.5)	1 (5.9)	0.615
ICSI	2 (10.5)	0	0.487
Placenta previa	0	0	
Maternal cardiac	0	0	

Data are presented as frequency (%). ICSI, intracytoplasmic sperm injection. *P is significant if <0.05.

face presentation in Robson group 1 and Robson group 6 were insignificant between 2019 and 2020 Table 4.

CS rate was insignificantly different between 2019 and 2020 in group 1, group 2, group 2a, group 2b and group 6. Relative group contribution to overall CS rate was insignificantly different between 2019 and 2020 in group 1, group 2, group 2a, group 2b and group 6 Table 5.

Discussion

Unexplained high rate of CS was recorded in the last years with no reflex on better maternal and neonatal outcomes [5]. A study by Begum *et al.* [6], said that commonest indications are previous CS, prolonged labour and foetal distress [7]. Indeed, with expert delivery monitoring, a lot of these cases can deliver normally [8]. In a subgroup analysis, the most common maternal and foetal indication for caesarean delivery in Group 1 was failure of progress (7.8% in 2019; 18% in 2020), meconium stained (24.7% in 2019; 11.5% in 2020) and

non-reassuring CTG (20.7% in 2019; 25.4% in 2020). By contrast, the most common indication in Group 2 was preeclampsia and eclampsia (22.1% in 2019; 27.2% in 2020), followed by on patient request (19.4% in 2019; 19.5% in 2020). Findings of this study by Abdel-Aleem *et al.* [9], reported that the prospective clinical audit of caesarean delivery at Assiut University Hospital, the most common indication in Group 1 was dystocia/failure of progress [18/62 (29.0%) in 2008; 46/66 (69.7%) in 2011].

The CS rate in group 1 (nulliparous, singleton, cephalic, ≥37 weeks, spontaneous labour) (49.5% in 2019 vs. 56.7% in 2020) was less as they came in spontaneous labour as compared with group 2 (nulliparous, singleton, cephalic, ≥37 weeks, induced labour or CS before labour) (72.5% in 2019 vs. 85.6% in 2020) where the labour was induced. As a result, group 6 (All nulliparous with a single breech) was (100% in 2019 and 2020).

The contribution of CSs from Group 1 (Nulliparous single cephalic women at term) is as high in our study

as compared with other studies [10,11]. Also, this finding is encouraging, showing that primary CS rate is high in the Assiut University Hospital.

Group 2 and Group 4 were also important contributors to the overall CS rate, accounting for one-third of CS deliveries. The CS rate within each group was also about 70%. Existing evidence suggests a high pre-labour CS rate at a particular institution if the CS rate within Group 2 and Group 4 is more than 35% and 20%, respectively [12]. Subdividing these groups into induced labour and CS before labour provides useful information regarding the proportion of pre-labour CS and the success of induction. Our subgroup analysis showed a large proportion of women in both groups underwent pre-labour CS. This calls for

further investigation of the indications for pre-labour CS. Similarly, a high rate of CS in these low-risk groups was observed in high resource settings like Italy, Singapore and Brazil [13,14]. Rates for women with breech presentations remained the same in our study (groups 6). Following the Term Breech Trials results, CS for breech rapidly increased worldwide [15]. Any increases in sedentary life intolerance to labour pain obesity, age and nulliparity among populations of women are not enough to explain increases. Using the term of CS on request with no medical indication is the major problem [16]. In accordance to factors associated with higher rates of vaginal births may include firm policies on CS due to maternal request, cultural or social pressure, differences in the legal framework for medical litigation, and strategies favoring home births, midwifery-led continuity models of care and approach to birth [17]. High-quality research is needed in the future to evaluate multicomponent and locally tailored interventions addressing women's and health professionals' demands as well as the health system when attempting to design and implement interventions aiming at reducing the number of unnecessary CS [5,18].

Banha university stated that the second highest CS rate were women in Group 2 who made a CS rate of 78.57% to the overall CS rate. In Group 6, CS rate was 92.85% CS rate. Women in Group 1 CS rate (9.82%) [19]. Although breech presentation may be avoided as an indication for CS. A careful look at this group revealed that 19/19 in 2019 audit and 16/16 women in 2020 audit of the women had no other risk factors besides breech presentation. We need to revise foetal presentation at 36 weeks, followed by external cephalic version (ECV) trial to safely reduce the need for CS [20,21]. From 1990 to 2018, the global average CS rate increased by 19 percentage points. Less developed countries had seen greatest increase (22.9 percentage points), while least developed countries saw the smallest (8.6 percentage points).Furthermore, the rate of primary CSn in Egypt has increased twofold over the study period, from 35% in 2004 to 70% in 2010 [22].

Table 4 Foetal caesarean delivery indications in the Robson group 1, Robson group 2 and Robson group 6 in 2019–2020

Items	Robson group 1		P
	2019 year, n (%)	2020 year, n (%)	
Foetal deceleration	24 (16.0)	18 (14.8)	0.777
Non-reassuring CTG	31 (20.7)	31 (25.4)	0.354
Foetal macrosomia	4 (2.7)	4 (3.3)	0.520
IUGR	1 (0.7)	1 (0.8)	0.697
Non-lethal anomaly	0	0	
Genital herpes	1 (0.7)	0	0.511
Brow or face presentation	2 (1.3)	4 (3.3)	0.415
Robson group 2			
Foetal deceleration	13 (3.7)	6 (2.6)	0.472
Non-reassuring CTG	9 (2.6)	10 (4.4)	0.234
Foetal macrosomia	28 (8.0)	18 (7.9)	0.956
IUGR	7 (2.0)	17 (7.5)	0.001*
Non-lethal anomaly	1 (0.3)	1 (0.4)	0.635
Genital herpes	0	0	
Brow or face presentation	0	0	
Robson group 6			
Foetal deceleration	0	1 (5.9)	0.472
Non-reassuring CTG	0	1 (5.9)	0.472
Foetal macrosomia	0	0	
IUGR	0	3 (17.6)	0.095
Non-lethal anomaly	0	0	
Genital herpes	1 (5.6)	0	0.1000
Brow or face presentation	0	0	

Data are presented as frequency (%). CTG, cardiotocography; IUGR, intrauterine growth restriction. *P is significant if <0.05.

Table 5 Proportion of each Robson groups, CS rate in each group, and their relative and absolute contribution to overall CS rate at Assiut (Egypt) (2019–2020)

Robson group	Number of CS in group		CS rate (%)[a]			Relative group contribution to overall CS rate (%)[b]		
	2019 year	2020 year	2019 year (%)	2020 year	OR (95% CI)	2019 year n=1565, (%)	2020 year n=1005	OR (95% CI)
Group 1	150	122	35.04	35.78% (0.74)	0.980 (0.742–1.294)	9.58	12.1% (2.52)	0.790 (0.614–1.016)
Group 2	349	227	64.62	77.73% (13.1)	0.831 (0.667–1.035)	22.3	22.5% (0.2)	0.987 (0.821–1.188)
2a	109	64	53.9	65.9% (12.1)	0.818 (0.552–1.211)	6.96	6.36% (−0.6)	1.094 (0.795–1.504)
2b	240	163	71.0	83.5% (12.5)	0.849 (0.651–1.108)	15.3	16.2% (0.9)	0.940 (0.763–1.171)
Group 6	19	17	100	100%		1.21	1.69% (0.48)	0.718 (0.371–1.387)

Data are presented as frequency (%). CS, caesarean section; OR, odds ratio. [a]Group CS rate (%) = n of CS in the group/total N of women in the group ×100. [b]Elative group contribution (%) = n of CS in the group/total N of CS in the hospital ×100.

Conclusions

Robson classification is a good tool for analysis of raising CS rate in our society.

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Conflicts of interest

There are no conflicts of interest.

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