Classical Caesarean Section Revisited in Modern Obstetrics

Winnie HUI MBBS, MRCOG
Vivian Kwan-Sin NG MBChB, FHKAM (Obstetrics and Gynaecology)
Wai-Lam LAU MBBS, FHKAM (Obstetrics and Gynaecology)
Wing-Cheong LEUNG MD, FHKAM (Obstetrics and Gynaecology)
Department of Obstetrics and Gynaecology, Kwong Wah Hospital, Yaumatei, Hong Kong

Objective: To review the incidence, indications, characteristics, and clinical outcomes of classical Caesarean section at a regional hospital in Hong Kong.
Methods: This was a retrospective case-series study of all women who underwent a classical Caesarean section over an 8-year period from 1 January 2008 to 31 December 2015 in our unit. Epidemiological data, indications for classical Caesarean section, and maternal and neonatal outcomes were analysed.
Results: There was an increasing trend of performing classical Caesarean section, both in our unit and other obstetrics units in Hong Kong under the Hospital Authority. Three main indications for classical Caesarean section were identified in our patients, including vascular lower segment, lower segment not well formed or inaccessible, and lower-segment uterine fibroids. The most common indication in our cohort was vascular lower segment due to placenta praevia with or without accreta. Compared with the groups of lower segment not well formed or inaccessible and lower-segment uterine fibroids, the total blood loss, need for subsequent secondary measures including compression suture and uterine artery embolisation, and admission to intensive care unit were statistically significantly highest in the vascular lower segment group.
Conclusion: Classical Caesarean section remained in its role in modern obstetrics for indications of placenta praevia, preterm delivery, as well as fibroids complicating pregnancies as demonstrated in our cohort study. As such, obstetricians should become adept at performing a classical Caesarean section because many cases will not have been predicted or will be required as an emergency procedure. With active involvement of consultants, a multidisciplinary approach and continuous training, the clinical outcome of classical Caesarean section can be reasonably good.
Hong Kong J Gynaecol Obstet Midwifery 2017; 17(2):86-93

Keywords: Cesarean section; Hemorrhage

Introduction

In the era of modern obstetrics, lower-segment Caesarean section has become the most common type of abdominal delivery since the last century. It is associated with less blood loss, lower risk of scar rupture, and less maternal and perinatal morbidity and mortality[1-4]. On the other hand, the classical Caesarean section remains a valid and important procedure in current practice. It was performed in 0.3% to 1% of all Caesarean sections for various indications that included transverse lie, preterm delivery[5], poor lower-segment formation, dense adhesions in the lower segment, placenta praevia[6], and invasive carcinoma of the cervix[7].

Kwong Wah Hospital is a regional hospital accounting for 5000 to 6000 deliveries per annum in Hong Kong. We can observe an increasing trend for classical Caesarean section, both in our unit and from territory-wide data in Hospital Authority. This study aimed to review the incidence and examine the current indications, characteristics, and obstetric outcome of women who underwent classical Caesarean section.

Methods

This was a retrospective case series of obstetric patients delivered by classical Caesarean section at Kwong Wah Hospital over an 8-year period from 1 January 2008 to 31 December 2015. The study was approved by the Ethics Committee of the Kowloon West Cluster, Hospital Authority, with the requirement of patient informed consent waived because of its retrospective nature.

All patients more than 24 weeks of gestation delivered by elective or emergency classical Caesarean section in our unit were included. One woman with a

Correspondence to: Dr Winnie Hui
Email: blueswinnie@gmail.com; hw029@ha.org.hk

J-shaped incision was also included as there was only one such case during the study period. Women were identified via the computerised Obstetrics Clinical Information System. All corresponding medical and operative records were reviewed in detail. Supplementary information was also retrieved from the Clinical Management System and the electronic Patient Record. Data retrieved for analysis included patient age, parity, body mass index at booking, number of previous abortions and Caesarean sections, medical history, gestation at and indications for Caesarean section, blood loss, operating time, interventions involved at and after delivery, and maternal and neonatal outcome.

Data were entered into Microsoft Office Excel 2007 and analysed using the Statistical Package for the Social Sciences (Windows version 22.0; IBM Corp, Armonk [NY], US). Categorical variables were analysed using Chi-square or Fisher's exact tests. Differences between continuous variables were analysed using analysis of variance. Level of statistical significance was set at $p<0.05$.

Results

The number of deliveries in our unit was approximately 5000 to 6000 per annum between January 2001 and December 2015 (Figure a). The total rate of Caesarean section was 23.1% in 2000 and 21.0% in 2015, with a peak incidence of 23.5% in 2008 (Figure b). The number of classical Caesarean sections performed in our unit has been increasing since 2008 (Figure c). This rise is also evident in all other Hospital Authority Obstetrics Units (Figure d). In our unit, there were only 19 cases of classical Caesarean sections from 2000 to 2007 (8 years), compared with 102 from 2008 to 2015 (8 years) [Figure c].

Among all Caesarean sections in our unit, the percentage of classical Caesarean sections varied from 0.1% to 2.7% during 2000 to 2015 (Figure b). Of the 102 classical Caesarean sections performed from 2008 to 2015, the indications were: placenta praevia type I-IV (n=56, 54.9%), fibroids (n=23, 22.5%), lower segment not well-formed (n=20, 19.6%), presence of transverse lie (n=9, 8.8%), lower-segment adhesions (n=8, 7.8%), and unstable lie (n=1, 1.0%). Among these patients, 13 had two indications and one had three.

The patients were further classified into three main groups according to their most important indication: group 1, vascular lower segment (53 cases, 52.0%); group 2, lower segment not well-formed / inaccessible (27 cases, 26.5%); and group 3, lower-segment fibroids (22 cases, 21.6%).

The mean age of all patients was 36.2 years, their mean gestation at delivery was 35.4 weeks, mean body mass index was 22.6 kg/m^2, mean operating time was 83.8 minutes, and mean blood loss was 875.5 ml. In 17 (16.7%) women, postpartum sterilisation was performed at the same surgery. Postpartum haemorrhage (PPH, defined as blood loss ≥1000 ml) occurred in 28 (27.5%) women of whom 20 (19.6% of 102) required admission to the intensive care unit (ICU). All of the patients received an oxytocin infusion after delivery as routine prophylaxis against PPH. In some instances, secondary measures were required to control PPH, including carboprost injection (n=10, 9.8%), balloon tamponade (mainly by Sengstaken Blakemore tube insertion, n=9, 8.8%), compression sutures (including Hwu's and modified B-lynch, n=22, 21.6%), and uterine artery embolisation (UAE; n=19, 18.6%). One woman required two UAEs sequentially postoperatively; 13 (12.7%) women required two or more secondary measures to control PPH.

Comparisons were made for the three groups with different main indications, including their demographics / characteristics (Table 1), maternal outcomes (Table 2), and neonatal outcomes (Table 3). The age ($p=0.01$), parity ($p=0.01$), number of previous abortions ($p=0.02$), and gestational age at delivery ($p<0.01$) were significantly different among the three groups. The mean age of the three groups exceeded 35 years signifying the impact of advanced maternal age. The mean gestational age at delivery was the lowest in group 2; and that for group 1 and group 3 was close to term. The majority of surgeons chose a midline skin incision in both group 1 and group 3.

There were significantly more patients in group 1 having a previous Caesarean section and requiring an elective classical Caesarean section under general anaesthesia compared with the other two groups (all $p<0.01$). Consultants were involved in the majority of cases, especially for group 1 with all patients having placenta praevia and group 3 with uterine fibroids, to ensure a judicious decision in the choice of classical Caesarean section as well as to offer immediate support intra-operatively. There were significantly more blood loss ($p=0.01$) and the operation was longer ($p<0.01$) in group 1 compared with the other two groups. Postoperative prophylactic antibiotics were given in more than 80% of cases in group 1 as there was a high risk of pelvic infection due to the need for multiple secondary measures to control PPH (Table 2). The placenta was retained as a conservative and fertility-preserving measure in some cases with placenta accreta, which also increased the risk of infection.

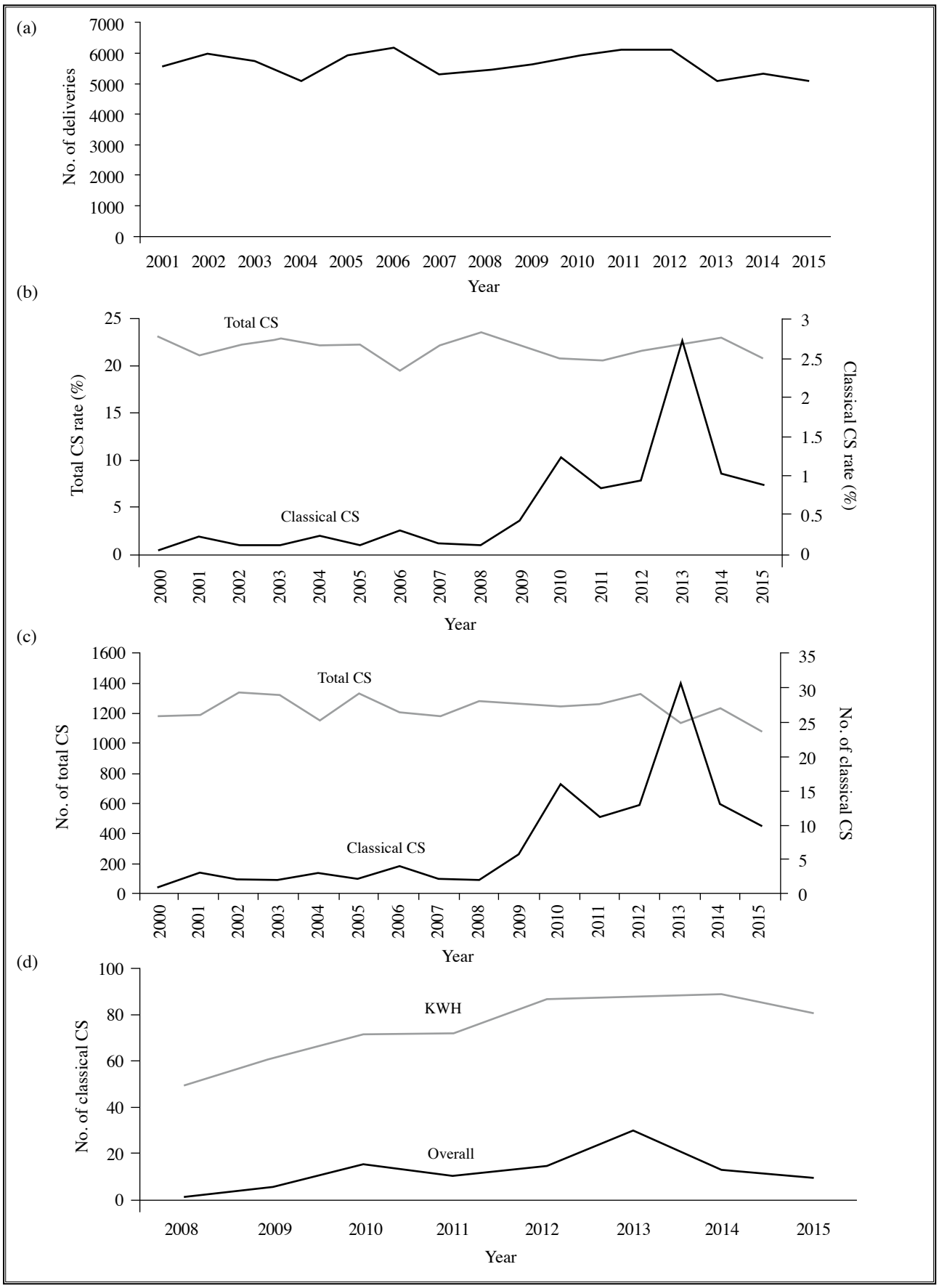

Figure. (a) Total number of deliveries in our unit from 2001 to 2015. (b) Percentage of classical Caesarean sections over total Caesarean sections in our unit during the same period. (c) Number of Caesarean sections (total and classical) in our unit from 2000 to 2015. (d) Number of classical Caesarean sections in our unit and in all Hospital Authority Obstetrics Units from 2008 to 2015

Abbreviations: CS = Caesarean section; KWH = Kwong Wah Hospital

Table 1. Comparison of basic demographics and characteristics between the three groups with different main indications*

Demographics / characteristics	Group 1: vascular lower segment (n=53)	Group 2: lower segment not well formed / inaccessible (n=27)	Group 3: lower-segment fibroids (n=22)	p Value
Age (years)	35.3 ± 3.3	36.6 ± 3.1	37.9 ± 4.3	0.01
No. of parities				
0	17 (32.1)	8 (29.6)	16 (72.7)	0.01
≥1	36 (67.9)	19 (70.4)	6 (27.3)	
No. of previous abortions				
0	21 (39.6)	9 (33.3)	13 (59.1)	0.02
1	18 (34.0)	10 (37.0)	6 (27.3)	
2	4 (7.5)	5 (18.5)	0 (0)	
≥3	10 (18.9)	3 (11.)	3 (13.6)	
Gestation at delivery (weeks)	36.5 ± 2.4	32.3 ± 5.2	36.7 ± 2.4	
≤34	7 (13.2)	16 (59.3)	3 (13.6)	<0.01
>34	46 (86.8)	11 (40.7)	19 (86.4)	<0.01
BMI at booking (kg/m^2)	22.1 ± 2.9	23.7 ± 3.5	22.6 ± 3.3	0.13
Previous CS	27 (50.9)	12 (44.4)	2 (9.1)	<0.01
Elective	47 (88.7)	11 (40.7)	4 (18.2)	<0.01
General anaesthesia	47 (88.7)	12 (44.4)	4 (18.2)	<0.01
Midline skin incision	39 (73.6)	9 (33.3)	16 (72.7)	<0.01
Consultant involvement	42 (79.2)	14 (51.9)†	18 (81.8)	0.02
Postoperative prophylactic antibiotics	43 (81.1)	16 (59.3)	11 (50.0)	0.01

Abbreviations: BMI = body mass index; CS = Caesarean section

* Data are shown as mean ± standard deviation or No. (%) of subjects

† Lower rate was probably because of the fact that the situation could be handled by specialist already

The mean length of hospital stay was not statistically different among the three groups.

In group 1, the reason for a vascular lower segment was solely due to placenta praevia type II to IV. There were two cases of placenta praevia type I associated with transverse lie that required classical Caesarean section due to poor lower-segment formation instead of vascularities; these were classified as group 2. One patient with a history of previous Caesarean section with placenta praevia type II was also classified in group 2 as the lower segment was inaccessible due to dense adhesions.

In group 1, seven women had placenta praevia type II, 25 had placenta praevia type III, and 21 had placenta praevia type IV. A total of 17 (32.1%) cases were diagnosed with placenta accreta intra-operatively. All were managed conservatively, with part of or the whole placenta left in situ, and none required hysterectomy. The majority (n=46, 86.8%) were delivered after 34 weeks. For those who delivered prematurely (n=7, 13.2%), all deliveries were performed as an emergency, either due to placenta praevia type III or IV with recurrent vaginal bleeding or severe pre-eclampsia. The number of patients who required blood transfusion, UAE as well as compression sutures was significantly higher in this group. The rate of ICU admission was also the highest in group 1 compared with the other two groups (p<0.01).

In group 2, the reasons for poorly formed or inaccessible lower uterine segment included mal-presentation or unstable lie (n=4, 14.8%), preterm delivery (at gestation 24-34 weeks; n=15, 55.6%), or dense adhesions (n=5, 18.5%) due to severe endometriosis, previous Caesarean section, or other pelvic surgery. There were two (7.4%) women with placenta praevia type I with malpresentation and one (3.7%) case of placenta praevia type II with dense lower-segment adhesions who were

Table 2. Maternal outcomes for the three groups with different main indications*

Maternal outcome	Group 1: vascular lower segment (n=53)	Group 2: lower segment not well formed / inaccessible (n=27)	Group 3: lower-segment fibroids (n=22)	p Value
Operating time (mins)	99.6 ± 55.6	67.4 ± 33.9	66.1 ± 26.3	<0.01
Blood loss (ml)	1096 ± 847.2	631 ± 618.2	643 ± 560.7	0.01
Length of hospital stay (postnatal) [days]	5.6 ± 2.5	5.7 ± 2.5	5.4 ± 4.4	0.94
Sterilisation	10 (18.9)	3 (11.1)	4 (18.2)	0.66
Transfusion	18 (34.0)	2 (7.4)	2 (9.1)	0.01
Secondary measures				
Carboprost	7 (13.2)	2 (7.4)	1 (4.5)	0.46
Uterine artery embolisation	19 (35.8)	0 (0)	0 (0)	<0.01
Balloon tamponade	7 (13.2)	1 (3.7)	1 (4.5)	0.27
Compression suture	20 (37.7)	1 (3.7)	1 (4.5)	<0.01
Hysterectomy	0 (0)	1 (3.7)	1 (4.5)	0.32
Postpartum fever (temperature ≥37.8°C)	6 (11.3)	5 (18.5)	3 (13.6)	0.68
Paralytic ileus	3 (5.7)	2 (7.4)	0 (0)	0.46
Wound complications	4 (7.5)	1 (3.7)	2 (9.1)	0.73
ICU admission	17 (32.1)	2 (7.4)	1 (4.5)	<0.01
Re-laparotomy	0 (0)	1 (3.7)	1 (4.5)	-
Maternal death	0 (0)	0 (0)	0 (0)	-

Abbreviation: ICU = Intensive care unit

* Data are shown as mean ± standard deviation or No. (%) of subjects

Table 3. Neonatal outcomes for the three groups with different main indications*

Neonatal outcome	Group 1: vascular lower segment (n=53)	Group 2: lower segment not well formed / inaccessible (n=27)	Group 3: lower-segment fibroids (n=22)	p Value
Paediatrician standby at delivery	52 (98.1)	18 (66.7)	9 (40.9)	<0.01
Gender				
Male	34 (64.2)	14 (51.9)	10 (45.5)	0.27
Female	19 (35.8)	13 (48.1)	12 (54.5)	
Birth weight (g)	2766 ± 594	1757 ± 1065	2529 ± 577	<0.01
Apgar score at 1 min	6.7 ± 2.3	6.3 ± 2.5	7.9 ± 1.3	0.04
Apgar score at 5 mins	9.3 ± 1.3	8.0 ± 2.2	9.4 ± 0.7	<0.01
Cord blood				
pH	7.3 ± 0.1	7.3 ± 0.1	7.2 ± 0.1	0.09
BE	-5.3 ± 3.5	-7.5 ± 5.0	-7.5 ± 5.7	0.10
SCBU admission	29 (54.7)	2 (7.4)	6 (27.3)	<0.01
NICU admission	5 (9.4)	16 (59.3)	3 (13.6)	<0.01
Neonatal death†	1 (1.9)	2 (7.4)	0	

Abbreviations: BE = base excess; NICU = neonatal intensive care unit; SCBU = special care baby unit

* Data are shown as mean ± standard deviation, or No. (%) of subjects

† All neonatal deaths were due to preterm or complications from preterm births (2 cases at 25th week and 1 case at 29th week of gestation)

classified in this group as mentioned above.

Blood loss was significantly lower in group 2 than the other two groups (p=0.01). None of the women required UAE although two required ICU admission. One with postoperative haemoperitoneum who required repeat laparotomy and one who required a Caesarean hysterectomy were due to an intra-operative incidental finding of percreta.

In group 3, the size of the lower-segment fibroids varied from 3 to 15 cm in diameter. In four women, myomectomy was performed at the same surgery, either to facilitate uterine wound closure or to control bleeding from the fibroids. The fibroids that were removed varied from 1 to 3 cm in diameter. Blood loss volume, and number of patients who required secondary measures and ICU admission were similar in group 2 and group 3, but significantly less than those in group 1. None of the cases required UAE. In group 3, one woman underwent hysterectomy and required ICU admission.

Oxytocin infusion was administered in all women for prophylaxis of PPH. There were more secondary measures performed in group 1 including use of additional uterotonic agents, UAE, balloon tamponade, as well as compression sutures. The absolute number of patients with fever, paralytic ileus, or wound complications remained low in three groups. Most patients with fever responded well to empirical antibiotics (including cefuroxime, metronidazole, amoxicillin/clavulanate). There was only one case of severe sepsis that required use of meropenem with a prolonged stay of 23 days. The rate of re-laparotomy was low and there was no maternal mortality. The patients' subsequent pregnancy outcomes were traced but only six cases were identified from the electronic Patient Record — four required repeat Caesarean section, one had a first-trimester miscarriage, and one had a Caesarean scar pregnancy.

Table 3 shows the neonatal outcomes in the three groups. Our protocol required a paediatrician to be available at the time of delivery in women with placenta praevia. Over 60% of women in group 2 had a paediatrician standby because of preterm delivery. The mean birth weight was statistically significantly the lowest in this group for the same reason, compared with the other two groups. This also accounted for the high proportion of neonatal ICU admission (p<0.01). The Apgar scores at 1 minute and 5 minutes were statistically different between the three groups but not clinically significant.

Discussion

The overall incidence of classical Caesarean section among all Caesarean sections in our unit (0.1%-2.7%) was comparable with the literature (0.3%-1%)[3,4,8]. The general indications for classical Caesarean section in our cohort were comparable with those identified in the literature and included malpresentation, placenta praevia, inadequate lower segment, and obstruction of labour due to fibroids[3,4,8,9]. Our study results showed that there was a larger proportion of classical Caesarean section performed for placenta praevia than for other indications. The results reveal a shift of the most common indication for classical Caesarean section from preterm delivery to placenta praevia[6].

Placenta type II to IV increases the lower-segment vascularity. To avoid cutting into the blood vessels or into the placenta, surgeons elect to perform a classical Caesarean section. Placenta praevia type I does not suffice on its own as a reason for classical Caesarean section although it increases the chance of malpresentation, e.g. transverse lie, that can affect formation of the lower segment. With the increasing trend of previous Caesarean section, the incidence of placenta praevia or morbidly adherent placenta is likely to increase[10]. Classical Caesarean section is usually performed for planned conservative management of placenta accreta[11]. The expected blood loss will be higher compared with that for other indications for classical Caesarean section. Of note, PPH remains one of the major causes of morbidity. In our unit, placenta praevia with PPH accounts for most of the ICU admissions in obstetric cases[12]. Yet with the use of the secondary measures to control PPH, the rate of hysterectomy remains low[13].

The lower segment is formed when the uterine muscle fibres are stretched and occurs in the third trimester from 28 to 40 weeks. It is thinner and less vascular. Previous studies have shown that the blood loss of classical Caesarean section is higher than that following 'lower-segment Caesarean section' for preterm delivery[14]. Nonetheless, in preterm deliveries the lower segment has not yet formed. Surgeons will avoid lateral extension of the wound and consequent injury to the uterine vessels and choose classical Caesarean section. Studies have shown that the incidence of classical hysterotomy is inversely related to gestational age in both singleton and twin pregnancies[5,15]. Fetal factors such as small for gestational age and non-cephalic presentations increase the likelihood of a classical Caesarean section[5]. Systematic reviews have shown that an estimated 14.9 million babies worldwide are born preterm, accounting for 11.1% of all livebirths[16]. Multiple pregnancies and iatrogenic

preterm births caused by pre-eclampsia and fetal growth restriction remain important causes of prematurity[17]. With advancing maternal age, these factors are likely to follow an increasing trend.

On the contrary, when the lower segment is covered by dense adhesions, e.g. previous Caesarean section or previous myomectomy with bladder adhesions, surgeons will avoid injury to the visceral organs and elect to perform a classical Caesarean section. Primary Caesarean births accounted for 50% of the increasing rate of Caesarean section. According to Barber et al[18], the repeat Caesarean rate among all live births was 6.7% in 1996, 9.8% in 2003, and 14.8% in 2009, representing an increase of 120.9%. The increasing repeat Caesarean rates probably reflect the increasing number of women who present with a previous primary Caesarean as well as the reducing number of women who are willing to have trial of labour or vaginal birth after Caesarean. It is likely that classical Caesarean section will continue to play a role in this group of patients with one or more previous Caesarean sections.

There has been an increasing incidence of fibroids in the pregnant uterus varying from 0.1% to 12.5%[19]. This may be due to increased maternal age. In our cohort, the mean age of the patients with fibroids complicating pregnancy was 37.9 years (p=0.01). Previous studies suggest that Caesarean myomectomy can lead to intractable haemorrhage and may necessitate Caesarean hysterectomy with its attendant complications and loss of future fertility[20,21]. There have been some suggestions that bleeding from Caesarean myomectomy can be controlled by oxytocin and tourniquet[22]. In our cohort, four cases with myomectomy were performed to facilitate wound closure. Blood loss was essentially less than that from placenta praevia. Although there was one case of hysterectomy in group 3, myomectomy was not performed.

Conclusion

Classical Caesarean section remained its role in modern obstetrics for indications of placenta praevia, preterm delivery, as well as fibroid complicating pregnancies as demonstrated in our cohort study. Obstetricians should master the skills required to perform a classical Caesarean section since many such surgeries will have been unpredicted or performed as an emergency. As a result of an increased involvement of consultants, a multidisciplinary approach and continuous training in the techniques of classical Caesarean section, the clinical outcome of classical Caesarean section can be reasonably good.

Declaration

The authors have disclosed no conflicts of interest.

References

1. Cesarean section — a brief history (part 3). Available from: https://www.nlm.nih.gov/exhibition/cesarean/part3.html. Accessed Oct 2016.
2. Royal College of Obstetricians and Gynaecologists (RCOG) Green-top guideline No. 45: Birth after previous caesarean birth. *UK: RCOG*; 2015.
3. Patterson LS, O'Connell CM, Baskett TF. Maternal and perinatal morbidity associated with classic and inverted T cesarean incisions. *Obstet Gynecol* 2002; 100:633-7.
4. Bethune M, Permezel M. The relationship between gestational age and the incidence of classical caesarean section. *Aust N Z J Obstet Gynaecol* 1997; 37:153-5.
5. Osmundson SS, Garabedian MJ, Lyell DJ. Risk factors for classical hysterotomy by gestational age. *Obstet Gynecol* 2013; 122:845-50.
6. Greene RA, Fitzpatrick C, Turner MJ. What are the maternal implications of a classical caesarean section? *J Obstet Gynaecol* 1998; 18:345-7.
7. McDonald SD, Faught W, Gruslin A. Cervical cancer during pregnancy. *J Obstet Gynaecol* Can 2002; 24:491-8.
8. Chauhan SP, Magann EF, Wiggs CD, Barrilleaux PS, Martin JN Jr. Pregnancy after classic cesarean delivery. *Obstet Gynecol* 2002; 100(5 Pt 1):946-50.
9. Nicholson SC, Brown AD, MacPherson HM, Liston WA. 'Classical' caesarean section at or near term in the morbidly obese obstetric patient. *J Obstet Gynaecol* 2002; 22:691.
10. Cheng KK, Lee MM. Rising incidence of morbidly adherent placenta and its association with previous caesarean section: a 15-year analysis in a tertiary hospital in Hong Kong. *Hong Kong Med J* 2015; 21:511-7.
11. Lo TK, Yung WK, Lau WL, Law B, Lau S, Leung WC. Planned conservative management of placenta accreta — experience of a regional general hospital. *J Matern Fetal Neonatal Med* 2014; 27:291-6.
12. Ng VK, Lo TK, Tsang HH, Lau WL, Leung WC. Intensive care unit admission of obstetric cases: a single centre experience with contemporary update. *Hong Kong Med J* 2014; 20:24-31.
13. Chan LL, Lo TK, Lau WL, et al. Use of second-line therapies for management of massive primary postpartum hemorrhage.

Int J Gynaecol Obstet 2013; 122:238-43.

14. Lao TT, Halpern SH, Crosby ET, Huh C. Uterine incision and maternal blood loss in preterm caesarean section. *Arch Gynecol Obstet* 1993; 252:113-7.
15. Osmundson SS, Garabedian MJ, Yeaton-Massey A, Lyell DJ. Risk factors for classical hysterotomy in twin pregnancies. *Obstet Gynecol* 2015; 125:643-8.
16. Blencowe H, Cousens S, Oestergaard MZ, et al. National, regional, and worldwide estimates of preterm birth rates in the year 2010 with time trends since 1990 for selected countries: a systematic analysis and implications. *Lancet* 2012; 379:2162-72.
17. Alfirevic Z, Owen J, Carreras Moratonas E, Sharp AN, Szychowski JM, Goya M. Vaginal progesterone, cerclage or cervical pessary for preventing preterm birth in asymptomatic singleton pregnant women with history of preterm birth and a sonographic short cervix. *Ultrasound Obstet Gynecol* 2013; 41:146-51.
18. Barber EL, Lundsberg LS, Belanger K, Pettker CM, Funai EF, Illuzzi JL. Indications contributing to the increasing cesarean delivery rate. *Obstet Gynecol* 2011; 118:29-38.
19. Laughlin SK, Baird DD, Savitz DA, Herring AH, Hartmann KE. Prevalence of uterine leiomyomas in the first trimester of pregnancy: an ultrasound screening study. *Obstet Gynecol* 2009; 113:630-5.
20. Machado LS, Gowri V, Al-Riyami N, Al-Kharusi L. Caesarean myomectomy feasibility and safety. *Sultan Qaboos Univ Med J* 2012; 12:190-6.
21. Ehigiegba AE, Ande AB, Ojobo SI. Myomectomy during cesarean section. *Int J Gynaecol Obstet* 2001; 75:21-5.
22. Li H, Du J, Jin L, Shi Z, Liu M. Myomectomy during cesarean section. *Acta Obstet Gynecol Scand* 2009; 88:183-6.