高龄经产妇剖宫产术中出血风险因素分析

陈小俊[1,2]，廖冰野[2]，林梦伊[2]，欧阳秋怡[2]，林文金[2]，李惠敏[2]，龚凤球[2]，金　宇[1]

（1. 中山大学公共卫生学院，广东 广州 510080；2. 中山大学附属第一医院手术室，广东 广州 510080）

摘　要：【目的】分析高龄经产妇剖宫产术中出血风险因素，为防治剖宫产术中出血提供理论依据。【方法】回顾分析 2015 年 1 月至 2019 年 12 月在中山大学附属第一医院高龄经产妇剖宫产 1 838 例临床资料。根据产妇术中出血量是否≥500 mL，分为出血组与常规出血组，分析产妇基本资料、术中因素、胎盘因素等各类因素与术中出血相关性，通过多因素二分类 Logistic 回归分析得出独立风险因素。【结果】Logistic 回归分析显示，手术时间［OR=1.069，95% CI 为（1.050，1.089），$P<0.001$］、胎盘娩出方式［OR=3.131，95%CI 为（1.259，7.782），$P=0.014$］、胎儿窘迫［OR=4.727，95%CI 为（1.191，18.763），$P=0.027$］、手术级别［OR=21.494，95%CI 为（6.031，76.611），$P<0.001$］、麻醉方式［OR=2.904，95%CI 为（1.158，7.281），$P=0.023$］和宫缩乏力［OR=7.255，95%CI 为（4.413，11.927），$P<0.001$］为术中出血独立风险因素。【结论】手术时间、胎儿窘迫、手术级别、麻醉方式、宫缩乏力、胎盘娩出方式是高龄经产妇剖宫产术中出血主要影响因素，临床应针对以上风险因素，制定相应措施，以减低剖宫产术中出血风险。

关键词：高龄产妇；经产妇；剖宫产；术中出血；风险

Analysis of Risk Factors of Hemorrhage During Cesarean Section in Multiparous Women with Advanced Delivery Age

CHEN Xiao-jun[1,2], LIAO Bing-ye[2], LIN Meng-yi[2], OUYANG Qiu-yi[2], LIN Wen-jin[2], LI Hui-min[2], GONG Feng-qiu[2], JIN Yu[1]

（1. School of Public Health, Sun Yat-sen University; 2. Operating Theatre The First Affiliated Hospital of Sun Yat-sen University, Guangzhou 510080, China）

Correspondence to：JIN Yu, E-mail：jinyu@mail.sysu.edu.cn

Abstract：【Objective】To analyze the risk factors of hemorrhage during cesarean section in multiparous women with advanced delivery age, and provide a theoretical basis for the prevention and treatment of hemorrhage during cesarean section. 【Methods】We retrospectively analyzed the clinical data of 1 838 women with advanced maternal age undergoing cesarean section in the First Affiliated Hospital of Sun Yat-sen University from January 2015 to December 2019. According to whether the intraoperative blood loss of the parturient is ≥ 500 mL, they were divided into hemorrhage group and non-hemorrhage group. The correlations of various factors such as basic maternal data, intraoperative factors, placental factors and intraoperative hemorrhage, and obtain the results by multi-factor binary logistic regression analysis independent risk factors were analyzed. 【Results】Logistic regression analysis showed that operation time ［OR=1.069, 95% CI：(1.050, 1.089), $P<0.001$］, placenta delivery method ［OR=3.131, 95%CI：(1.259, 7.782), $P=0.014$］, fetal distress ［OR=4.727, 95% CI：(1.191, 18.763), $P=0.027$］, surgical grade ［OR=21.494, 95%CI：(6.031, 76.611), $P<0.001$］, anesthesia method ［OR=2.904, 95%CI：(1.158, 7.281), $P=0.023$］ and weak uterine contractions ［OR=7.255, 95%CI：(4.413, 11.927), $P<0.001$］ were independent risk factors for intraoperative hemorrhage. 【Conclusions】Operation time,

fetal distress, operation level, anesthesia, uterine weakness, and placental delivery are the main influencing factors for bleeding during cesarean section in elderly women who have undergone cesarean section. Clinical measures should be taken to reduce the risk of hemorrhage during cesarean section.

Key words：advanced maternal age；multipara；cesarean section；intraoperative hemorrhage；risk

全国妇幼卫生监测数据[1]显示，2017年上半年我国孕产妇死亡率同比上升30.6%。国家卫生计生委统计数据[2]显示，2017年我国孕产妇死亡率为19.6/10万，其中，产科出血、妊娠期高血压疾病、妊娠合并心脏病、羊水栓塞是导致我国孕产妇死亡的主要原因。孕产妇死亡率是衡量妇幼工作核心指标，也是反映一个国家和地区经济、文化、卫生状况综合指标。研究表明，术中出血是产妇发病和死亡的主要原因，因此，产前识别术中出血风险因素对于剖宫产术中产妇的安全有重要意义[3-4]。再次剖宫产高龄产妇的产后出血发生率为8.7%，高龄产妇出血发生率是适龄初产妇的3倍[3]。迄今，针对高龄经产妇剖宫产术中出血风险因素分析报道较少。系统分析经产妇剖宫产术中的出血风险因素，及时有效预防经产妇剖宫产术中出血尤为关键。

1　材料与方法

1.1　病例资料

搜集整理2015年1月至2019年12月在本院实施剖宫产分娩产妇6 674例临床资料，其中，高龄经产妇1 838例的临床资料，年龄35～51(38.47±2.79)岁。纳入分析标准：①年龄≥35岁；②均为有过分娩史产妇；③妊娠满28周；④经诊断为宫内妊娠；⑤住院治疗孕妇；⑥在本院分娩；⑦符合剖宫产手术指征并行剖宫产术的患者；⑧临床病例资料完整。排除标准：①存在相关检查禁忌症；②临床病历资料不够完整；③发现其他重要脏器损伤；④认知功能不正常或者有精神病史。该研究符合医院伦理委员会相关标准。

1.2　分组及研究方法

研究报道[5-6]，将剖宫产术中出血量<500 mL的产妇划入常规出血组，将出血量≥500 mL的产妇划入出血组。采用容积法和面积法测量出血量。容积法为减去羊水量后负压瓶中液体总量，血凝块在量杯内测量；被血液浸湿敷料用面积法。在文献分析和综述基础上，进行专家咨询，设计《高龄经产妇剖宫产术中出血监测登记表》，仔细查阅患者资料，详细记录两组患者资料。调查项目：①产妇一般资料；②产孕妇出血风险评估因素；③结局指标：剖宫产术中出血量。

1.3　统计学方法

应用Epidata 3.0软件对数据双人进行录入，采用SPSS 25.0统计软件进行分析。采用Kolmogorov-Smirnov和Shapiro-Wilk法进行正态性检验，正态分布且方差齐计量资料用均数、标准差表示，通过正态分布和齐性检验，身高符合正态分布且方差齐，两组比较采用独立样本t检验；其余因素为非正态分布计量资料，采用用中位数$M (P_{25} \sim P_{75})$表示，两组比较采用Wilcoxon秩和检验；计数资料采用频率、百分比(率)表述，两组比较采用Pearson χ^2检验、校正卡方检验或Fisher精确概率法。采用二分类Logistic多因素回归分析是否出血的影响因素，方法采用逐步向前法(forward：Conditional法)，控制混杂因子，筛选出独立影响因素，检验水准取双侧$\alpha=0.05$。

2　结　　果

2.1　数据展示与高龄经产妇剖宫产趋势分析

在选取的研究时间段内，本院实施剖宫产分娩产妇共6 674例，其中，高龄经产妇1 838例，占27.54%；出血组216例，占11.75%，常规出血组1 622例，占88.25%。2015年高龄经产妇剖宫产34例，2016年78例，2017年90例，2018年496例，2019年1 140例，高龄经产妇剖宫产例数处于快速增加趋势。

2.2　高龄经产妇剖宫产术中出血风险单因素统计分析

通过统计分析，以下因素差异具有统计学意义(均$P<0.05$)，包括：两组产妇体质量、体质量指数(body mass index，BMI)值、腹围、胎数、是否规律产检，是否合并(凝血功能障碍、高血压、糖尿病、产后

出血史、产前出血、胎儿窘迫、胎盘植入、宫腔粘连、子宫发育不良),产前入盆、新生儿体质量、早产、手术时间、紧急剖宫产、术中子宫撕裂、胎盘勉出方式、胎盘完整、手术级别、美国麻醉师协会(American Society of Anesthesiologists,ASA)分级、麻醉方式、术中子宫收缩情况(表1)。

表1 两组产妇单因素分析结果

Table 1 Univariate analysis results of two groups of parturients $[\bar{x} \pm s, M(P_{25} \sim P_{75}), n(\%)]$

Variables	Assignment	Routine hemorrhage group (n=1 622)	Hemorrhage group (n=216)	$t/Z/\chi^2$	P
Height/meter	/	1.58±0.45	1.59±0.44	0.565[1]	0.572
Age/years	/	38.0(36.0~40.0)	38.0(36.0~40.0)	−0.286[2]	0.775
NA	/	1(0~2)	1(0~2)	−0.273[2]	0.785
PI/years	/	12(9.5~15.0)	12.1(10.0~14.4)	−0.191[2]	0.848
Weight/kg	/	67.0(62.0~72.5)	69.0(63.8~75.0)	−3.931[2]	0.000
BMI/(kg/m^2)	/	26.6(24.9~28.6)	27.3(25.7~29.7)	−4.906[2]	0.000
Fundal height/cm	/	34.0(33.0~36.0)	34.5(33.0~36.0)	−0.325[2]	0.745
Abdominal girth/cm	/	100.0(96.0~104.0)	100.5(97.5~105.0)	−2.247[2]	0.025
Fetus number	/	1(1~1)	1(1~1)	−3.051[2]	0.002
NP	/	3.0(2.0~4.0)	3.0(2.0~4.0)	−0.664[2]	0.506
RPE				9.317[3]	0.002
No	0	62(3.8)	18(8.3)		
Yes	1	1560(96.2)	198(91.7)		
Coagulation disorders				40.045[3]	0.000
No	0	1 476(91.0)	166(76.9)		
Yes	1	146(9.0)	50(23.1)		
Hypertension				5.119[4]	0.024
No	0	1 534(94.6)	212(98.1)		
Yes	1	88(5.4)	4(1.9)		
Diabetes				5.358[3]	0.021
No	0	1 204(74.2)	176(81.5)		
Yes	1	418(25.8)	40(18.5)		
HPH				57.889[3]	0.000
No	0	1 608(99.1)	198(91.7)		
Yes	1	14(0.9)	18(8.3)		
Antepartum hemorrhage				47.646[3]	0.000
No	0	1 616(99.6)	204(94.4)		
Yes	1	6(0.4)	12(5.6)		
Fetal distress				23.321[3]	0.000
No	0	1 544(95.2)	188(87.0)		
Yes	1	78(4.8)	28(13.0)		
Placenta accreta				10.714[3]	0.001
No	0	1 608(99.1)	208(96.3)		
Yes	1	14(0.9)	8(3.7)		
I/P−A				9.928[3]	0.002
No	0	1 430(88.2)	174(80.6)		
Yes	1	192(11.8)	42(19.4)		

续表

Variables	Assignment	Routine hemorrhage group (n=1 622)	Hemorrhage group (n=216)	t/ Z /χ²	P
Uterine dysplasia				6.108[3]	0.013
Yes	0	292(18.0)	54(25.0)		
No	1	1 330(82.0)	162(75.0)		
Prenatal into basin				4.617[3]	0.032
No	0	896(55.2)	136(63.0)		
Yes	1	726(44.8)	80(37.0)		
Neonatal weight				14.116[3]	0.001
Underweight	0	174(10.7)	42(19.4)		
Normal	1	1 406(86.7)	168(77.8)		
overweight	2	42(2.6)	6(2.8)		
Premature delivery				44.198[3]	0.000
No	0	1 432(88.3)	156(72.2)		
Yes	1	190(11.7)	60(27.8)		
Operation time/min		48.0(39.0 ~ 61.0)	82.0(63.5 ~ 105.0)	−16.295[2]	0.000
ECS				7.164[3]	0.007
No	0	1 038(64.0)	118(54.6)		
Yes	1	584(36.0)	98(45.4)		
IUL				82.083[3]	0.000
No	0	1 620(99.9)	202(93.5)		
Yes	1	2(0.1)	14(6.5)		
PDI				34.594[3]	0.000
Yes	0	1 394(90.2)	228(78.1)		
No	1	152(9.8)	64(21.9)		
Placenta integrity				31.462[3]	0.000
No	0	24(1.5)	16(7.4)		
Yes	1	1 598(98.5)	200(92.6)		
Surgical grade				156.100[4]	0.000
I	1	2(0.1)	0		
II	2	1 554(95.8)	140(66.0)		
III	3	66(4.1)	72(34.0)		
ASA				23.549[3]	0.000
I	1	356(21.9)	40(18.5)		
II	2	1 244(76.7)	160(74.1)		
III	3	22(1.4)	16(7.4)		
Anesthesia method				30.640[3]	0.000
CSEA	1	1 568(96.7)	191(88.9)		
EA	2	38(2.3)	8(3.7)		
GA	3	16(1.0)	17(7.4)		
Uterine atony				341.814[3]	0.000
Good	0	502(30.9)	12(5.6)		
Not good enough	1	1 058(65.2)	120(55.6)		
Poor	2	62(3.8)	84(38.9)		

　　[1]t test was used;[2]Rank sum test was used;[3]Chi−square test was used;[4]CALIBRATION Chi−square test;NA:number of abortions;PI:pregnancy interval;NP:number of pregnancy;RPE:regular prenatal examination;HPH:history of postpartum hemorrhage;I/P−A:intrauterine/placental adhesions; ECS:emergence cesarean section; IUL: intraoperative uterine laceration; PDI: placenta delivered by itself;CSEA :combined spinal epidural anesthesia;EA:epidural anesthesia;GA:general anesthesia

2.3 高龄经产妇剖宫产术中出血风险多因素Logistic回归分析

将单因素分析 $P<0.05$ 的变量作为自变量,以是否发生术中出血结局为因变量,采用非条件多因素 Logistic 回归分析。Logistic 回归分析显示,手术时间[Odds Ratio(OR)=1.069,95%Confidence Interval(CI)为(1.050,1.089),$P<0.001$]、胎盘娩出方式[OR=3.131,95%CI 为(1.259,7.782),$P=0.014$]、胎儿窘迫[OR=4.727,95%CI 为(1.191,18.763),$P=0.027$]、手术级别[OR=21.494,95%CI 为(6.031~76.611),$P<0.001$]、麻醉方式[OR=2.904,95%CI 为(1.158~7.281),$P=0.023$]和宫缩乏力[OR=7.255,95%CI 为(4.413~11.927),$P<0.001$]为术中出血独立风险因素(表2)。

3 讨 论

近年来高龄、经产妇、高危妊娠比例明显增多并呈现不断上升趋势[7],高龄经产妇由于器官功能和机体功能下降,预示着产妇面临更严重出血风险,甚至面临情况恶化以及生命危险,如围产期子宫切除和孕产妇死亡等[8-9]。为明确高龄经产妇剖宫产术中出血风险因素,本研究通过回顾分析2015-2019年在我院实施剖宫产高龄经产妇病例资料,采用二分类 Logistic 多因素回归分析。结果显示,与适龄初产妇剖宫产术中出血影响因素不同,高龄经产妇剖宫产术中出血独立风险因素有手术时间、胎儿窘迫、手术级别、麻醉方式、宫缩乏力、胎盘需要人工剥离。

Chen 等[10]研究证实孕妇高龄会影响围产期结局,本研究结果显示,手术时间及手术级别是影响高龄经产妇出血危险因素。由于高龄经产妇多有手术史、盆腔粘连、器官粘连、卵巢肿瘤、子宫肌瘤、子宫切除、子宫破裂等并发症,增大手术操作难度[11]。为避免手术中损伤子宫周围脏器,需更多时间去松解粘连、缝合、结扎血管,甚至需要栓塞子宫动脉、纱条填塞宫腔等,延长手术时间,手术级别相应提高,增加发生术中出血的风险[12]。Carbetocin 围产期治疗指南指出,宫缩乏力是产妇围产期出血重要危险因素[13],对于高龄经产妇剖宫产产妇,由于子宫功能降低,腹腔结缔组织增多[14],同时,腹壁松弛,加上伴有瘢痕子宫、高血压和前置胎盘等高危因素,较适龄产妇容易出现体力不支、宫缩乏力和胎儿窘迫症状,血管收缩功能受影响,导致剖宫产术中出血风险[15]。

Fernandes[16]研究发现急诊剖宫产手术时全麻比其他麻醉方式产妇更容易出血,本研究结果显示,高龄经产妇全麻比硬膜外麻醉剖宫产手术术中出血发生率高。对于有出血风险、不宜采用椎管内麻醉禁忌或椎管内麻醉失败等高危产妇,首选全麻方式进行手术[17]。另外,全麻使用的药物对子宫收缩和产妇凝血功能有影响,与椎管内麻比较,更容易导致术中出血[18]。正常情况下胎儿娩出后,胎盘会自主娩出。产妇无法自然娩出胎盘,需要人工剥离胎盘时,术中出血发生率更高。王马列等[19]通过临床分析得出,当胎盘存在胎盘植入、前置胎盘等胎盘异常情况,胎盘将长时间无法自主娩出,需要人为协助剥离胎盘,将造成子宫内膜损伤和胎盘组织滞留,引起大出血且出血迅速,严重出血难以控制时,需行子宫切除。

表2 高龄经产妇剖宫产术中出血风险多因素 Logistic 回归分析

Table 2 Multivariate Logistic regression analysis on risk factors of hemorrhage in cesarean section of advanced maternal age

Variables	B	SE	Wald χ^2	P	OR	95%CI
Operation time/min	0.067	0.009	52.440	0.000	1.069	(1.050,1.089)
Placenta delivery method	1.141	0.465	6.034	0.014	3.131	(1.259,7.782)
Fetal distress	1.553	0.703	4.877	0.027	4.727	(1.191,18.763)
Surgical grade	3.068	0.648	22.381	0.000	21.494	(6.031,76.611)
Anesthesia method	1.066	0.469	5.166	0.023	2.904	(1.158,7.281)
Uterine atony	1.982	0.254	61.052	0.000	7.255	(4.413,11.927)

SE:standard error

综上所述,由于受年龄和分娩史等因素影响,高龄经产妇剖宫产术中出血风险增高。手术时间、胎儿窘迫、手术级别、麻醉方式、宫缩乏力、胎盘需人工剥离为影响高龄二胎产妇剖宫产术中出血主要风险因素。因此,临床工作中需加强高龄经产妇剖宫产术中出血风险评估,术中实时监测,密切关注产妇生命体征及出血量,对影响术中出血高位风险因素积极提前干预,并针对产妇存在相应风险因素展开治疗,以有效降低剖宫产术中出血风险,保障高龄经产妇安全和妊娠质量。

参考文献

[1] 王娟娟,朱建华. 危重孕产妇治疗的现状与思考[J]. 现代实用医学, 2018, 30(4): 426-427, 430. Wang JJ, Zhu JH. Current status and thinking on treatment of critically ill pregnant women[J]. Modern Pract Med, 2018, 30(4): 426-427, 430.

[2] Rai V, Shariffuddin II, Chan YK, et al. Peri-operative management of hysterostomy in a parturient with complete heart block, placenta accreta and intrauterine death[J]. BMC Anesthesiol, 2014, 14: 49.

[3] Li Q, Deng D. New medical risks affecting obstetrics after implementation of the two-child policy in China[J]. Front Med, 2017, 11(4): 570-575.

[4] Ma Y, Shao M, Shao X. Analysis of risk factors for intraoperative hemorrhage of cesarean scar pregnancy[J]. Medicine (Baltimore), 2017, 96(25): e7327.

[5] Saad A, Costantine MM. Obstetric hemorrhage: recent advances[J]. Clin Obstet Gynecol, 2014, 57(4): 791-796.

[6] Kolas T, Oian P, Skjeldestad FE. Risks for peri-operative excessive blood loss in cesarean delivery[J]. Acta Obstet Gynecol Scand, 2010, 89(5): 658-663.

[7] Rydahl E, Declercq E, Juhl M, et al. Cesarean section on a rise-does advanced maternal age explain the increase? A population register-based study[J]. PLoS One, 2019, 14(1): e210655.

[8] Frederiksen LE, Ernst A, Brix N, et al. Risk of Adverse Pregnancy Outcomes at Advanced Maternal Age[J]. Obstet Gynecol, 2018, 131(3): 457-463.

[9] Leader J, Bajwa A, Lanes A, et al. The effect of very advanced maternal age on maternal and neonatal outcomes: a systematic review[J]. J Obstet Gynaecol Can, 2018, 40(9): 1208-1218.

[10] Chen Y, Zheng XL, Wu SW, et al. Clinic characteristics of women with advanced maternal age and perinatal outcomes[J]. Zhonghua Fu Chan Ke Za Zhi, 2017, 52(8): 508-513.

[11] Ryu JM, Choi YS, Bae JY. Bleeding control using intrauterine continuous running suture during cesarean section in pregnant women with placenta previa[J]. Arch Gynecol Obstet, 2019, 299(1): 135-139.

[12] Yapca OE, Topdagi YE, Al RA. Fetus delivery time in extraperitoneal versus transperitoneal cesarean section: a randomized trial[J]. J Matern Fetal Neonatal Med, 2020, 33(4): 657-663.

[13] Chao YS, Mccormack S. Carbetocin for the prevention of post-partum hemorrhage: a review of clinical effectiveness, cost-effectiveness, and guidelines[M]. Ottawa (ON): Canadian Agency for Drugs and Technologies in Health, 2019.

[14] Bullens LM, Smith JS, Truijens S, et al. Maternal hemoglobin level and its relation to fetal distress, mode of delivery, and short-term neonatal outcome: a retrospective cohort study[J]. J Matern Fetal Neonatal Med, 2020, 33(20): 3418-3424.

[15] Kim ML, Hur YM, Ryu H, et al. Clinical outcomes of prophylactic compression sutures for treatment of uterine atony during the cesarean delivery of twins[J]. BMC Pregnancy Childbirth, 2020, 20(1): 40.

[16] Fernandes NL, Dyer RA. Anesthesia for urgent cesarean section[J]. Clin Perinatol, 2019, 46(4): 785-799.

[17] Kang HW, Kim WY, Jin SJ, et al. Clinical evaluation of anesthesia for high-risk cesarean section at a tertiary medical center: retrospective study for 8 years (2009-2016)[J]. J Int Med Res, 2019, 47(9): 4365-4373.

[18] Arora G, Sahni N. Anesthetic management of a patient with Sheehan's syndrome and twin pregnancy while undergoing a cesarean section[J]. J Postgrad Med, 2020, 66(1): 51-53.

[19] 王马列,郑菊,祝彩霞,等. 产科急症子宫切除术51例临床分析[J]. 中山大学学报(医学科学版), 2016, 37(5): 757-762. Wang ML, Zheng J, Zhu CX, et al. Clinical analysis of 51 cases of acute obstetric hysterectomy[J]. J Sun Yat-sen Univ (Med Sci), 2016, 37(5): 757-762.

(编辑 余 菁)