doi: 10.13241/j.cnki.pmb.2017.12.041

# ANH 自体输血在完全性前置胎盘合并胎盘植入剖宫产术中的应用

郭仙鹤[1] 马 丽[2] 刘圆圆[3] 潘清华[1] 谭雪秋[1]

(1 内蒙古兴安职业技术学院医学院 内蒙古 乌兰浩特 137400;2 内蒙古民族大学附属医院妇产科 内蒙古 通辽 028050;
3 内蒙古兴安盟人民医院妇产科 内蒙古 乌兰浩特 137400)

**摘要 目的:**研究急性等容血液稀释(ANH)自体输血在完全性前置胎盘合并胎盘植入剖宫产术中的应用价值。**方法:**选择 2012 年 1 月～2015 年 12 月在我院进行诊治的完全性前置胎盘合并胎盘植入患者 80 例,随机分为三组,对照组(n=26)进行常规处理,ANH 组(n=27)进行急性等容血液稀释,AHH(急性高容血液稀释)组(n=27)进行急性高容血液稀释。比较三组产妇的体重、年龄、手术时间、术中出血量、输注异体血例数,ANH 组和 AHH 组血液稀释前后和三组产妇术后的动脉血气分析值、术后 2 h 血常规,三组新生儿娩出后 1min、5min Apgar 评分及脐动脉血血气分析值。**结果:**血液稀释后,两组的血红蛋白、红细胞比容和碱剩余均较血液稀释前明显降低(P<0.05),两组血气分析无明显差异(P>0.05);ANH 组输注异体血的比例明显低于 AHH 组和对照组(P<0.05),剖宫产术后 2h,ANH 组的血红蛋白、红细胞比容和血小板均明显高于 AHH 组和对照组(P<0.05);三组新生儿的血红蛋白、红细胞比容、碱剩余、血乳酸和 Apgar 评分均无明显差异(P>0.05)。**结论:**ANH 自体输血能减少异体血的输注和产妇剖宫术中红细胞的丢失,节约临床用血,对产妇和新生儿的影响较小。

**关键词:**完全性前置胎盘;胎盘植入;剖宫产术;急性等容血液稀释

**中图分类号:**714.462;R719 **文献标识码:**A **文章编号:**1673-6273(2017)12-2361-03

# Application of Acute Normovolemic Hemodilution(ANH) Autohemotransfusion in Complete Placenta Previa Merged Placenta Increta Cesarean Section

*GUO Xian-he[1], MA Li[2], LIU Yuan-yuan[3], PAN Qing-hua[1], TAN Xue-qiu[1]*

*(1 Medical school, Xing An vocational and technical college, Ulanhot, Inner Mongolia, 137400, China;
2 Obstetrics and Gynecology, Affiliated hospital of inner Mongolia university for the Nationalities, Tongliao, Inner Mongolia, 028050, China; 3 Obstetrics and Gynecology, Xinganleague people's hospital, Ulanhot, Inner Mongolia, 137400, China)*

**ABSTRACT Objective:** To investigate the application value of acute normovolemic hemodilution (ANH) autohemotransfusion in complete placenta previa merged placenta increta cesarean section. **Methods:** 80 cases of patients with complete placenta previa merged placenta increta cesarean section from January 2012 to December 2015 were selected and divided into the control group (n=26, Conventional treatment), ANH group (n=27, acute normovolemic hemodilution) and AHH group (n=27, acute hypervolemic hemodilution). The body weight, age, operation time, intraoperative blood loss, blood infusion cases,arterial blood gas analysis values, 2 h after routine blood, apgar score and umbilical artery blood gas analysis values 1 min, 5 min after partum of three groups were compared. **Results:** After the blood dilution, the hemoglobin, red blood cell volume and residual alkali of ANH and AHH group were significantly lower than before treatment (P<0.05), no significant difference was found in the blood gas analysis between two groups(P 0.05). The percentage of allogeneic blood transfusion of ANH group was significantly lower than those of the AHH group and control group (P<0.05); at 2 h after cesarean section, the hemoglobin, red blood cell volume and platelets of the ANH group were significantly higher than those of the AHH group and control group (P<0.05); no significant difference was found in the hemoglobin, red blood cell volume , residual alkali, blood lactic acid and apgar score between three groups (P 0.05). **Conclusions:** ANH autohemotransfusion could reduce the allogeneic blood infusion and the loss of red blood cells in cesarean section, save the clinical use, and has little effect on the maternal and newborn.

**Key words:** Complete placenta previa; Placental implantation; Cesarean section; Acute normovolemic hemodilution

**Chinese Library Classification(CLC): R714.462; R719 Document code: A**

**Article ID: 1673-6273(2017)12-2361-03**

## 前言

前置胎盘是妊娠晚期的严重并发症,胎盘植入是指胎盘组织部分或完全植入到子宫肌层内,是产科的急症和重症[1,2]。完全性前置胎盘合并胎盘植入易引起妊娠晚期、尤其是产时孕妇大出血,对孕妇和胎儿的生命健康造成严重危害,特别是 Rh 阴

作者简介:郭仙鹤(1981-),女,本科,高校讲师,主要研究方向:妇产科教学,E-mail: guoxianhe_0987@sina.com

(收稿日期:2017-01-04 接受日期:2017-01-25)

性患者的血源比较紧张,如何确保这类患者的手术安全是目前产科急需解决的重要问题[3-5]。急性等容血液稀释(ANH)是一种安全、科学、有效的输血方法[6],本研究旨在研 ANH 自体输血在完全性前置胎盘合并胎盘植入剖宫产术中的应用价值,现报道如下。

## 1 资料与方法

### 1.1 一般资料

80 例全性前置胎盘合并胎盘植入患者来自我院 2012 年 1 月至 2015 年 12 月,ASA 分级为Ⅰ级或Ⅱ级, 无凝血功能异常,无肝肾功能异常,无血液系统疾病,根据就诊先后顺序编号,采用奇偶数法随机分为三组。本研究获得我院伦理委员会的批准,所有患者均签署知情同意书。三组的基线资料具有可比性(P>0.05),见表 1。

**表 1 三组一般情况比较**

Table 1 Comparison of the general conditions between three groups

| Groups | Cases | Weight(kg) | Age(y) | ASA classification (Ⅰ/Ⅱ grade) | Hematocrystallin before blood dilution (g/L) | Blood loss during operation (mL) | Duration of operation (min) |
|---|---|---|---|---|---|---|---|
| ANH group | 27 | 69.12± 3.58 | 27.62± 3.15 | 8/19 | 115.32± 11.56 | 1025.37± 58.96 | 65.41± 6.23 |
| AHH group | 27 | 70.23± 4.15 | 28.14± 2.96 | 7/20 | 116.45± 10.96 | 1036.48± 62.15 | 66.73± 5.85 |
| Control group | 26 | 69.42± 4.24 | 26.79± 4.13 | 8/18 | 116.73± 10.58 | 1041.58± 59.12 | 65.46± 7.15 |

### 1.2 治疗方法

ANH 组:采用四川科仪诚科技有限公司生产的 CZK-IB 型微电脑采液控制器采集自体血,通过另外一条静脉输注等容等量的 6 %羟乙基淀粉 130/0.4。AHH 组: 在剖宫产术前 30 min 内补充 10 mL/kg 的 6%羟乙基淀粉 130/0.4。对照组:根据生理需要量以 100 mL/h 的速度静脉输注复方乳酸钠注射液。所有患者均取左侧卧位,进行连续硬膜外麻醉,手术期间维持患者平均动脉压波动低于基础值的 20 %。术中密切监测血气指标,当发现产妇血红蛋白水平小于 80 g/L 时,ANH 组回输自体血,当血液不足时再进行异体血的输注,AHH 组和对照组直接输注异体血,维持血红蛋白水平在 80~90 g/L。

### 1.3 观察指标

比较三组产妇的体重、年龄、手术时间、术中出血量、输注异体血例数,采用丹麦雷度 ABL80 血气分析仪检测 ANH 组和 AHH 组血液稀释前后和三组产妇术后的动脉血气分析值、术后 2 h 血常规,三组新生儿娩出后 1 min、5 min Apgar 评分及脐动脉血血气分析值。

### 1.4 统计学分析

采用 SPSS15.00,组间计量资料对比用 t 检验,组间计数资料的比较用 $\chi^2$ 检验,以 P<0.05 为差异有统计学意义。

## 2 结果

### 2.1 ANH 组和 AHH 组血气分析结果的比较

两组的血红蛋白、红细胞比容和碱剩余均较血液稀释前明显降低(P<0.05),两组血气分析结果比较差异无明显统计学意义(P>0.05),见表 2。

**表 2 ANH 组和 AHH 组血气分析结果的比较($\bar{x}\pm s$)**

Table 2 Comparison of the blood gas analysis results between ANH group and AHH group

| Groups | Cases | | Hemoglobin (g/L) | Hematocrit value (%) | Base excess | Blood lactate (mmol/L) |
|---|---|---|---|---|---|---|
| ANH group | 27 | Before the blood dilution | 115.32± 11.53 | 37.45± 4.96 | 1.69± 0.23 | 0.59± 0.03 |
| | 27 | After the blood dilution | 103.56± 10.45[◦] | 30.23± 2.16[◦] | 0.63± 0.02[◦] | 0.61± 0.02 |
| AHH group | 27 | Before the blood dilution | 112.56± 12.38 | 36.92± 5.15 | 1.71± 0.45 | 0.58± 0.04 |
| | 27 | After the blood dilution | 102.53± 11.42[◦] | 30.46± 3.75[◦] | 0.61± 0.05[◦] | 0.60± 0.03 |

Note: Compared with before the blood dilution, ◦ P<0.05.

### 2.2 三组输注异体血比例和血红蛋白、红细胞比容和血小板比较

ANH 组输注异体血的比例明显低于 AHH 组和对照组(P<0.05),剖宫产术后 2 h,ANH 组的血红蛋白、红细胞比容和血小板均明显高于 AHH 组和对照组(P<0.05),见表 2。

### 2.3 三组新生儿脐动脉血血气分析和 Apgar 评分的比较

三组新生儿的血红蛋白、红细胞比容、碱剩余、血乳酸和 Apgar 评分比较差异均无统计学意义(P>0.05),见表 4。

## 3 讨论

前置胎盘指妊娠 28 周后,胎盘位置低于胎先露部,附着于子宫下段,胎盘的下缘甚至会到达或覆盖宫颈内口[7]。完全性前置胎盘是胎盘完全性覆盖子宫颈内口, 临床上以孕期出血频繁、出血早和出血量多为主要特点[8,9]。当出现前置胎盘合并胎盘植入时,由于子宫下段蜕膜发育不完全,胎盘绒毛会随之侵入到子宫子层,与肌层之间失去分界,使得剖宫产时胎盘剥离不全甚至无法剥离而发生较为严重的产后大出血,甚至发生失血性休克、弥散性血管内凝血,需要进行大输血、或者行子宫动脉栓塞或结扎术,必要时甚至需要切除子宫来抢救生命,使患

表 3 三组异体血比例、血红蛋白、红细胞比容和血小板比较($\bar{x}\pm s$)

Table 3 Comparison of the percentage of allogeneic blood infusion, hemoglobin, red blood cell volume and platelets between three groups($\bar{x}\pm s$)

| Groups | Cases | Allogeneic blood infusion [n(%)] | Hemoglobin (g/L) | Red blood cell volume (%) | Platelets (× $10^9$/L) |
|---|---|---|---|---|---|
| ANH group | 27 | 2(7.41) | 99.38± 7.94 | 29.72± 3.15 | 198.43± 26.72 |
| AHH group | 27 | 9(33.33)[a] | 90.26± 8.52[a] | 15.42± 2.76[a] | 145.96± 31.25[a] |
| Control group | 26 | 16(61.54)[a,b] | 86.73± 7.58[a] | 14.92± 2.13[a] | 143.25± 35.26[a] |

Note: Compared with ANH group, [a] P<0.05; Compared withAHH group, [b] P<0.05.

表 4 三组新生儿脐动脉血血气分析结果和 Apgar 评分的比较

Table 4 Comparison of the blood gas analysis results and Apgar score of the newborn between threegroups

| Groups | Cases | Hemoglobin (g/L) | Red blood cell volume (%) | Base excess | Blood lactate (mmol/L) | Apgar score | |
|---|---|---|---|---|---|---|---|
| | | | | | | 1 min | 5 min |
| ANH group | 27 | 156.32± 12.53 | 46.52± 11.23 | -2.81± 0.32 | 1.72± 0.33 | 9.62± 0.31 | 9.91± 0.05 |
| AHH group | 27 | 159.37± 11.35 | 47.96± 10.15 | -2.63± 0.25 | 1.85± 0.26 | 9.51± 0.42 | 9.92± 0.21 |
| Control group | 26 | 158.72± 11.54 | 46.38± 10.26 | -2.79± 0.23 | 1.79± 0.21 | 9.43± 0.35 | 9.92± 0.15 |

者失去生育能力[10-12]。

急性血液稀释包括 ANH 和 AHH,这两种方法对产科大出血的患者均比较适用[13,14]。但妊娠产妇的血容量一般从 6~8 周开始升高,并持续升高到产后 2~3 周,在整个妊娠期血容量可以升高 30%~40%[15,16]。如果在剖宫手术前产妇使用 AHH,会大大增加循环血容量,使心肺负担加重,易出现急性心衰、肺水肿等一系列并发症,从而限制了 AHH 在产科的进一步应用。ANH 作为一种有效的保护血液措施,是指机体急性失血或者人工放血时输入外源性液体代替血液,以保持血容量在正常范围。一方面,经过血液稀释,可以使剖宫产手术中产妇的红细胞丢失大大减少,并降低心脏后负荷及血液黏稠度,增加脑灌注及心排出量,从而改善脑缺血状态,发挥脑保护作用;另一方面,ANH 有助于开放冠脉侧支循环,保护缺血心肌[17,18]。近年来,ANH 在减少血源传播性疾病围和手术期输注异体血方面的作用受到广泛关注[19,20],但目前关于其在完全性前置胎盘合并胎盘植入剖宫产术中的应用报道较少。

本研究结果显示 ANH 组输注异体血的比例明显低于 AHH 组和对照组,剖宫产术后 2 h,ANH 组的血红蛋白、红细胞比容和血小板均明显高于 AHH 组和对照组,提示 ANH 自体输血能减少异体血的输注,并减少产妇剖宫术中血红蛋白、红细胞和血小板的丢失。完全性前置胎盘合并胎盘植入因出血比较早,易造成胎儿早产,由于胎儿各系统尚未发育成熟,新生儿极易出现脑出血呼吸窘迫、等并发症。三组新生儿的血红蛋白、红细胞比容、碱剩余、血乳酸和 Apgar 评分均无明显差异,提示 ANH 不会降低新生儿脐动脉血的血红蛋白、红细胞比容、碱剩余、血乳酸,对新生儿是安全的。

综上所述,ANH 自体输血能减少异体血的输注和产妇剖宫术中红细胞的丢失,节约临床用血,对产妇和新生儿的影响较小。

## 参 考 文 献(References)

[1] WANG Y, WANG Y, SING Y. Clinical analysis of15 cases dangerous type of placenta previa [J]. Medical Journal of National Defending Forces in Southwest China, 2011, 21(7): 751-752

[2] Matsubara S. Practical consideration of inserting intrauterine balloon during cesarean section for placenta previa. [J]. Acta Obstetricia et Gynecologica Scandinavica, 2014, 93(1): 120-121

[3] Gurol-Urganci I, Cromwell D A, Edozien L C, et al. Risk of placenta previa in second birth after first birth cesarean section: a population-based study and meta-analysis [J]. Bmc Pregnancy & Childbirth, 2011, 11(1): 47-49

[4] Gó mez L, Madriñan-Navia H, Morales-Cá rdenas A, et al. Percretismo placentario asociado con placenta previa y abruptio: reporte de un caso [J]. Progresos De Obstetricia Y Ginecologí a, 2014, 58(3): 136-140

[5] Heidari Z, Sakhavar N, Mahmoudzadehsagheb H, et al. Stereological Analysis of Human Placenta in Cases of Placenta Previa in Comparison with Normally Implanted Controls [J]. Journal of Reproduction & Infertility, 2015, 16(2): 90-95

[6] Reyher C, Bingold T M, Menzel S, et al. Impact of acute normovolemic hemodilution on primary hemostasis [J]. Der Anaesthesist, 2014, 63(6): 496-502

[7] Downes K L, Hinkle S N, Sjaarda L A, et al. Previous prelabor or intrapartum cesarean delivery and risk of placenta previa [J]. American Journal of Obstetrics & Gynecology, 2015, 212 (5): 669. e1-669.e6.

[8] Henry A, Jennifer L R, Elena B, et al. Asymptomatic "placental prolapse" with cervical funneling in a patient with complete placenta previa[J]. Journal of Clinical Ultrasound Jcu, 2014, 43(2): 122-125

[9] Young B C, Nadel A, Kaimal A. Does previa location matter? Surgical morbidity associated with location of a placenta previa [J]. American Journal of Obstetrics & Gynecology, 2014, 208(1): S57

[10] Lal A, Gao W, Hibbard J. Placenta previa: an outcome-based cohort study in a contemporary obstetric population [J]. American Journal of Obstetrics & Gynecology, 2015, 292(2): 299-305 （下转第 2320 页）

Chinese medicine, 2014, 12(8): 1266-1268

[4] Freitas A, Maciel RA, Lima Rde A, et al. Mechanical analysis of femoral neck fracture fixation with dynamic condylar screw in synthetic bone[J]. Acta Ortop Bras, 2014, 22(5): 264-268

[5] 张志愿,俞光岩.口腔颌面外科学[M].7 版,北京:人民卫生出版社, 2012: 254
Zhang Zhi-yuan, Yu Guang-yan. Oral and maxillofacial surgery[M]. 7th version, Beijing: People's Health Publishing House, 2012: 254

[6] Chagou A, Rhanim A, Zanati R, et al. Blount technique in the treatment of supra condylar fractures of the elbow in children: report of 68 cases[J]. Pan Afr Med J, 2014, 22(9): 52

[7] Chang Cai-wang, Yang Le, Meng Zhi-bing. Mandibular ramus with condylar process free accurate reduction of replantation in treating condylar high comminuted fractures [J]. Oral medicine, 2013, 33(8): 570-572

[8] Chen Rui, Yang Kai, Li Wen-juan, et al. Application and evaluation of clinical lag screw in intracapsular condylar sagittal fracture [J]. Chongqing medicine, 2015, 44(1): 50-51

[9] Li Jun. Clinical analysis of 61 cases of maxillofacial fractures [J]. Journal of Guangdong Medical College, 2013, 31(3): 302-304

[10] Buturovic S, Krupic F. Comparison of treatment results for fractures of the distal humerus in children according to the indication for conservative or surgical solution [J]. Mater Sociomed, 2014, 26(4): 242-245

[11] Choi MG. Transmasseteric antero-parotid facelift approach for open reduction and internal fixation of condylar fractures [J].J Korean Assoc Oral Maxillofac Surg, 2015, 41(3): 149-155

[12] Zhu Yao-min, Zheng Cang-shang, Deng Yong-qiang, et al. Clinical analysis of 50 cases of condylar fracture and surgical treatment of[J]. chin J Med(electronic version), 2012, 6(2): 182-186

[13] Roychoudhury A. Undiagnosed pediatric condylar fractures and ankylosis of the temporomandibular joint [J]. Natl J Maxillofac Surg, 2014, 5(2): 107-108

[14] An Si-yao, Chen Zhi-yong, Wang Tao, et al. A mandible development of partial malocclusion in animal model of new method [J]. Modern biomedical progress, 2013, 13(6)is: 1019-1021

[15] Vranis NM, Mundinger GS, Bellamy JL, et al. Extracapsular Mandibular Condyle Fractures Are Associated With Severe Blunt Internal Carotid Artery Injury:Analysis of 605 Patients [J]. Plast Reconstr Surg, 2015, 12(6): 113-117

[16] Murakami K, Yamamoto K, Sugiura T, et al. Biomechanical analysis of poly-L-lactic acid and titanium plates fixated for mandibular symphyseal fracture with a conservatively treated unilateral condylar fracture using the three-dimensional finite element method [J]. Dent Traumatol, 2015, 5(5): 1045-1051

[17] Nagori SA, Jose A, Bhutia O, et al. Undiagnosed mandibular condylar fractures causing temporomandibular joint ankylosis: A problem in northern India[J]. Natl Med J India, 2014, 27(5): 251-255

[18] Liu Wei, Chen Xun Li Ming-da, et al. Clinical characteristics and treatment of mandibular condylar fractures [J]. Journal of Nanchang University(Medical Science Edition), 2014, 54(12): 52-55

[19] Anyanechi CE. Temporomandibular joint ankylosis caused by condylar fractures: a retrospective analysis of cases at an urban teaching hospital in Nigeria [J]. Int J Oral Maxillofac Surg, 2015, 17 (5): 79-85

[20] Xiang Chao, Tan Ying-hui, Zhang Gang, et al. Application of rapid prototyping technology in repairing bone defect of clinical research [J]. Progress in modern biomedicine, 2013, 13(35): 6886-6889

(上接第 2363 页)

[11] Laban M, Ibrahim A S, Elsafty M S E, et al. Placenta accreta is associated with decreased decidual natural killer (dNK) cells population: a comparative pilot study [J]. European Journal of Obstetrics & Gynecology & Reproductive Biology, 2014, 181(1): 284 -288

[12] Frí as N B, Gredilla E, Guasch E, et al. Inserció n de balones intraarteriales ilí acos previa a la realizació n de cesá rea ante la sospecha de acretismo placentario [J]. Revista Espanola De Anestesiologia Y Reanimacion, 2014, 61(61): 105-108

[13] Licker M, Sierra J, Kalangos A, et al. Cardioprotective effects of acute normovolemic hemodilution in patients with severe aortic stenosis undergoing valve replacement [J]. Transfusion, 2014, 47(2): 341-350

[14] Goldberg J, Paugh T A, Dickinson T A, et al. Greater Volume of Acute Normovolemic Hemodilution May Aid in Reducing Blood Transfusions After Cardiac Surgery [J]. Annals of Thoracic Surgery, 2015, 100(5): 1581-1587

[15] Sujay Kumar Parasa, Prasanna Udupi Bidkar, Parida S. Acute normovolemic hemodilution to avoid blood transfusion during intracranial aneurysm surgery in a patient with atypical antibodies[J]. Anesthesia, Essays and Researches, 2015, 10(1): 136-138

[16] Vricella L K, Louis J M, Chien E, et al. Blood volume determination in obese and normal-weight gravidas: the hydroxyethyl starch method [J]. American Journal of Obstetrics & Gynecology, 2015, 213(3): 1-6

[17] Frazilio F O, Otsuki D A, Noel-Morgan J, et al. Evaluation of Neuronal Apoptosis Precursors in an Experimental Model of Acute Normovolemic Hemodilution [J]. Plos One, 2014, 9 (9): e108366-e108366

[18] Lu S Y, Konig G, Yazer M H, et al. Stationary versus agitated storage of whole blood during acute normovolemic hemodilution [J]. Anesthesia & Analgesia, 2014, 118(2): 264-268

[19] Reyher C, Bingold T M, Menzel S, et al. Impact of acute normovolemic hemodilution on primary hemostasis [J]. Der Anaesthesist, 2014, 63(6): 496-502

[20] Parasa SK, Bidkar PU, Parida S. Acute normovolemic hemodilution to avoid blood transfusion during intracranial aneurysm surgery in a patient with atypical antibodies [J]. Anesth Essays Res, 2016, 10(1): 136-138