

· 老年人骨质疏松专栏 ·

老年髋部骨折围术期输血与临床预后的关系

张立海¹, 谭 晶¹, 龙安华^{1,2}, 李鸿达^{1,2}, 张里程¹, 唐佩福^{1*}

(¹解放军总医院骨科, 北京 100853; ²南开大学医学院, 天津 300071)

【摘要】目的 研究老年髋部骨折围术期输血与临床预后的关系。**方法** 回顾性地分析解放军总医院2010年~2012年期间连续性收治的所有老年髋部骨折患者, 将最低血红蛋白(Hb) > 80g/L的患者按照围术期是否输血分为输血组及未输血组。比较两组患者术后并发症及术后1个月、12个月死亡率差异, 分析围术期输血与术后死亡的相关性。**结果** 共纳入931例患者, 706 (75.8%) 例患者接受输血治疗, 输血组最低Hb浓度为(105.2 ± 15.4) g/L, 未输血组最低Hb浓度为(110.5 ± 16.5) g/L。输血组术后心脑血管并发症发生率明显高于未输血组(7.5% vs 3.6%, $P = 0.037$), 两组患者术后感染性并发症及死亡率差异均无统计学意义(均 $P > 0.05$)。多因素分析结果显示高龄及低Hb浓度为术后死亡的独立危险因素, 而输血并非影响死亡的独立因素。**结论** 高龄和低Hb浓度是老年髋部骨折患者术后死亡的独立危险因素, 但围术期输血并不能明显改善患者预后。

【关键词】 髋骨折; 贫血; 输血; 死亡率

【中图分类号】 R683.421

【文献标识码】 A

【DOI】 10.3724/SP.J.1264.2014.000112

Relationship of perioperative blood transfusion with clinical prognosis in elderly hip fracture patients: analysis of 931 cases

ZHANG Li-Hai¹, TAN Jing¹, LONG An-Hua^{1,2}, LI Hong-Da^{1,2}, ZHANG Li-Cheng¹, TANG Pei-Fu^{1*}

(¹Department of Orthopedics, Chinese PLA General Hospital, Beijing 100853, China; ²School of Medicine, Nankai University, Tianjin 300071, China)

【Abstract】 Objective To investigate the relationship of perioperative blood transfusion with clinical prognosis in the elderly hip fracture patients. **Methods** Consecutive elderly patients (over 60 years old) with hip fracture admitted in our department during the years of 2010 to 2012 were subjected and retrospectively analyzed. All patients with the lowest hemoglobin (Hb) concentration > 80g/L were divided into 2 groups, receiving red blood cell transfusion (transfusion group) or not (control group). The incidence of postoperative complications and 1-month or 12-month mortality were compared between the 2 groups. The correlation of perioperative blood transfusion with postoperative death was analyzed. **Results** A total of 931 patients were recruited in this study. There were 706 (75.8%) patients receiving red blood cell transfusion, from them the mean lowest Hb in concentration was (105.2 ± 15.4)g/L. And among the patients without blood transfusion the lowest Hb concentration was (110.5 ± 16.5)g/L. The incidence of postoperative cardiovascular complications was obviously higher in the transfusion group than in control group (7.5% vs 3.6%, $P = 0.037$), but there was no significant difference in postoperative infectious complications or mortality between the 2 groups ($P > 0.05$). Multivariate analysis showed that senior age and low Hb concentration were independent risk factors for postoperative death, but blood transfusion was not. **Conclusion** Senior age and low Hb concentration are independent risk factors for elderly patients suffering hip fractures, but perioperative blood transfusion can not improve the outcomes of these patients.

【Key words】 hip fractures; anemia; blood transfusion; mortality

This work was supported by the Special Fund of Health Industry (201302007).

Corresponding author: TANG Pei-Fu, E-mail: pftang301@126.com

随着老龄化社会到来, 我国髋部骨折发病率逐渐升高^[1-3]。髋部骨折患者多为老年人, 合并多种内科并发症, 常伴随严重贫血^[4-6]。贫血易导致重要器

官的供血、供氧不足和患者抵抗力下降, 因此患者术后容易并发感染的心脑血管疾病, 严重者导致死亡^[7]。异体红细胞输入是目前最有效的快速纠正围

收稿日期: 2014-04-08; 修回日期: 2014-05-20

基金项目: 卫生行业专项基金(201302007)

通信作者: 唐佩福, E-mail: pftang301@126.com

术前贫血的治疗方式。但有关输血对患者术后临床预后的影响尚存争议,有文献报道输血可以减少术后并发症,降低死亡率^[7,8],也有报道输血反而增加患者术后死亡率^[9]。因此,本研究对我院老年髌部骨折患者进行回顾分析,探讨围术期输血与患者临床预后的关系。

1 对象与方法

1.1 研究对象

病例选自解放军总医院2010年至2012年期间连续收治的所有髌部骨折病例。纳入标准:(1)年龄 ≥ 60 岁;(2)创伤导致新发的股骨颈骨折或粗隆间骨折;(3)最低血红蛋白(Hb)浓度 $> 80\text{g/L}$ 。排除标准:(1)病理性骨折;(2)因各种原因未接受手术治疗。

1.2 临床终点指标

通过我院电子病历系统提取患者基本信息及治疗与手术情况,电子数据库获取所有患者住院检查化验结果。采取门诊复查、问卷及电话随访等方式随访患者的康复情况,随访时间12~24个月不等。按照围术期是否输血将所有患者分为输血组及未输血组。主要观察指标为术后1个月及12个月死亡率,次要观察指标为患者住院期间并发症发生率。术后并发症包括感染性并发症(切口感染、深部感染、肺部感染、泌尿系统感染等)及心脑血管并发症(心绞痛、心肌梗死、心力衰竭、心律失常、脑梗死、脑出血等)。

1.3 统计学处理

所有数据采用SPSS13.0进行统计学分析。分类变量及构成比的比较使用卡方检验比较各组差异,连续性变量若服从正态分布及方差齐性采用t检验,否则采用秩和检验比较各组差异。根据Kaplan-Meier方法计算病死率,使用log-rank检验比较各组患者生存时间差异并采用Cox比例风险模型进行多因素分析。 $P < 0.05$ 为差异有统计学意义。

2 结果

本研究共纳入老年髌部骨折患者931例,年龄60~105(75.0 ± 11.4)岁,男性340(36.5%)例,女性591(63.5%)例,其中粗隆间骨折441(47.4%)例,股骨颈骨折490(52.6%)例。795例患者在手术1年后得到随访,随访时间为(15.3 ± 6.8)个月,失访率为14.6%。全部患者住院期间最低Hb均 $> 80\text{g/L}$,其中706例接受异体红细胞输入,其Hb为(105.0 ± 15.4)g/L,225例未输血患者的Hb为(110.0 ± 16.5)g/L。输血组患者平均年龄更大,

女性患者所占比例更高,ASA麻醉评分Ⅲ~Ⅴ级比例更高(均 $P < 0.05$)。两组患者骨折类型及术前并存疾病数目并无统计学差异(均 $P > 0.05$),但输血组关节置换比例明显更高,未输血组髓外固定比例更高($P < 0.001$;表1)。

输血组患者住院期间总并发症发生率为10.7%,明显高于未输血组患者5.8%($P = 0.046$)。亚组分析显示输血组患者感染性并发症发生率较未输血组高,但差异无统计学意义(4.0% vs 2.2%, $P = 0.300$);输血组患者心脑血管并发症为7.5%(53/706),未输血组为3.6%(8/225),输血组较未输血组明显更高($P = 0.037$)。

Kaplan-Meier生存分析结果如表2所示。输血组术后1个月及12个月死亡率分别为2.4%和7.8%,未输血组分别为1.3%和5.3%,两组患者死亡率差异无统计学意义(均 $P > 0.05$)。采用Cox回归分析将年龄、性别、美国麻醉医师协会(ASA)评分、骨折类型作为协变量进行多因素分析,结果显示仅年龄及最低Hb浓度为患者术后死亡的独立危险因素,其死亡风险比分别为年龄(HR 1.09, 95%CI: 1.01~1.11)、最低Hb浓度(HR 0.94, 95%CI: 0.90~0.99)。性别、ASA评分、骨折类型、手术类型及是否输血均不是术后死亡的独立危险因素(均 $P > 0.05$;表3)。

表1 输血组及未输血组患者基本信息及并存疾病情况
Table1 Basic characteristics and comorbidities in two groups

Item	Transfusion group (n = 706)	Control group (n = 225)
Age(years, $\bar{x} \pm s$)	76 $\pm$ 10.6	70 $\pm$ 13.8**
Gender[n(%)]		
Male	239 (33.9)	101 (44.9)**
Famale	467 (66.1)	124 (55.1)**
Type of fracture[n(%)]		
Intertrochanteric fracture	324 (45.9)	117 (52.0)
Femoral neck fracture	382 (54.1)	108 (48.0)
Type of surgery[n(%)]		
Extramedullary	25 (3.5)	84 (37.3)***
Intramedullary	266 (37.7)	90 (40.0)***
Arthroplasty	415 (58.8)	51 (22.7)***
Lowest Hb(g/L, $\bar{x} \pm s$)	105.2 $\pm$ 15.4	110.5 $\pm$ 16.5**
ASA Score[n(%)]		
I - II	317 (51.8)	133 (70.4)**
III - V	295 (48.2)	56 (29.6)**
Number of comorbidities[n(%)]		
0	182 (25.8)	75 (33.3)
1	202 (28.6)	62 (27.6)
2	163 (23.1)	39 (17.3)
3+	208 (22.5)	49 (21.8)

Hb: hemoglobin; ASA: American Society of Anesthesiologists. Compared with transfusion group, ** $P < 0.01$, *** $P < 0.001$

表2 患者术后并发症和死亡率的分布特征

Table 2 The postoperative complications and mortality in two groups [n(%)]

Item	Transfusion group (n = 707)	Control group (n = 225)
Total complications	76 (10.7)	13 (5.8)
Infectious complications	28 (4.0)	5 (2.2)
Cardio-cerebrovascular complications	53 (7.5)	8 (3.6)*
1-month mortality	17 (2.4)	3 (1.3)
12-month mortality	48 (7.8)	9 (5.3)

Compared with transfusion group, *P < 0.05

表3 术后12个月死亡的多因素回归分析

Table 3 The multivariate analysis using logistic regression

Item	HR	95% CI
Age	1.09	1.01–1.11
Male	0.76	0.39–1.24
ASA score	1.63	0.89–2.82
Type of fracture(intertrochanteric fracture)	1.26	0.69–1.84
Type of surgery(arthroplasty)	0.89	0.49–1.61
Lowest Hb	0.94	0.90–0.99
Transfusion	2.23	0.75–4.69

HR: hazard ratio; CI: confidence interval; Hb: hemoglobin; ASA: American Society of Anesthesiologists

3 讨论

本研究结果显示围术期输血并未改善老年髋部骨折患者的临床预后,输血组患者术后并发症及死亡率与未输血组无明显差异,而且输血组术后心脑血管并发症发生率明显更高,需引起临床医师注意。

髋部骨折患者容易并发贫血,据文献报道术前贫血发生率可高达40%~80%^[10]。贫血造成机体组织供血供氧不足,降低患者对手术的耐受性,可能导致严重不良结果。Dunne等^[11]报道围术期贫血是术后感染、死亡的独立危险因素,Carson等^[12]认为贫血不仅导致并发症增多,更影响患者术后功能锻炼及康复。异体红细胞输入可快速、有效纠正老年髋部骨折围术期贫血,因此被广泛应用于临床。但目前尚无统一的输血指征用于老年髋部骨折,临床上对这类患者倡导个体化输血策略。Carson等^[13]认为术后若患者无贫血症状,即使Hb浓度临界值<80g/L,甚至患者有潜在心血管疾病风险或者合并其他危险因素,也不必给予输血治疗。但证据显示若围术期Hb浓度<60g/L时,明显增加患者死亡风险^[14]。Foss等^[15]主张Hb浓度<80g/L时应积极输血,Hb浓度应维持在≥90g/L。我院主张老年髋部骨折患者Hb浓度<90g/L时积极行输血治疗,对于高龄老年患者可适当放宽输血指征,在我们的研究中所有输血组患者Hb最低为(105.0±15.4)g/L。

近年有研究报道围术期输血并不能改善髋部

骨折患者预后,围术期输血的安全性及必要性开始受到质疑。Shokoohi等^[16]认为围术期输血并不能降低老年髋部骨折术后死亡率,反而会增加术后感染风险。Marik等^[17]认为在成年重症监护室、创伤及手术患者中,输血可能增加术后并发症和死亡率。我们的研究结果显示围术期输血并不增加患者术后感染并发症发生率,但可能增加患者术后心脑血管疾病并发症发生率,这可能与患者既往合并心脑血管病有关系。Zarychanski等^[14]研究发现,慢性失血导致贫血的患者可过快纠正贫血,否则易诱发心血管疾病。Carson等^[18]发现合并心血管疾病病史的患者,即使Hb浓度在70~80g/L时,其死亡风险也较低。因此,合并心脑血管病史的患者输血治疗时须严格把握输血指征,不能过度纠正贫血,否则会加重患者术后并发心脑血管疾病风险及死亡风险。多因素分析结果显示患者高龄、低Hb是患者术后死亡的独立危险因素,但是否输血却不是,提示我们对于最低Hb>80g/L患者,输血或许无法有效改善其临床预后。

综上所述,贫血是老年髋部骨折后严重的并发症,严重贫血不利于患者的治疗及康复。尽管输血是目前最有效的治疗方式,但对于最低Hb>80g/L患者输血适应证需要根据Hb浓度变化及患者病情,制定个体化、合理的输血方案以促进患者康复。

【参考文献】

- [1] Xia WB, He SL, Xu L, *et al.* Rapidly increasing rates of hip fracture in Beijing, China[J]. J Bone Miner Res, 2012, 27(1): 125–129.
- [2] Tian FM, Zhang L, Zhao HY, *et al.* An increase in the incidence of hip fractures in Tangshan, China[J]. Osteoporos Int, 2014, 25(4): 1321–1325.
- [3] Chau PH, Wong M, Lee A, *et al.* Trends in hip fracture incidence and mortality in Chinese population from Hong Kong 2001–09[J]. Age Ageing, 2013, 42(2): 229–233.
- [4] Kumar D, Mbako AN, Riddick A, *et al.* On admission haemoglobin in patients with hip fracture[J]. Injury, 2011, 42(2): 167–170.
- [5] Haentjens P, Magaziner J, Colón-Emeric CS, *et al.* Meta-analysis: excess mortality after hip fracture among older women and men[J]. Ann Intern Med, 2010, 152(6): 380–390.
- [6] Musallam KM, Tamim HM, Richards T, *et al.* Preoperative anaemia and postoperative outcomes in non-cardiac surgery: a retrospective cohort study[J]. Lancet, 2011, 378(9800): 1396–1407.
- [7] Foss NB, Kristensen MT, Kehlet H. Anaemia impedes

- functional mobility after hip fracture surgery[J]. Age Ageing, 2008, 37(2): 173-178.
- [8] Hagino T, Ochiai S, Sato E, *et al.* The relationship between anemia at admission and outcome in patients older than 60 years with hip fracture[J]. J Orthop Traumatol, 2009, 10(3): 119-122.
- [9] Johnston P, Wynn-Jones H, Chakravarty D, *et al.* Is perioperative blood transfusion a risk factor for mortality or infection after hip fracture[J]? J Orthop Trauma, 2006, 20(10): 675-679.
- [10] Spahn DR. Anemia and patient blood management in hip and knee surgery: a systematic review of the literature[J]. Anesthesiology, 2010, 113(2): 482-495.
- [11] Dunne JR, Malone D, Tracy JK, *et al.* Perioperative anemia: an independent risk factor for infection, mortality, and resource utilization in surgery[J]. J Surg Res, 2002, 102(2): 237-244.
- [12] Carson JL, Duff A, Poses RM, *et al.* Effect of anaemia and cardiovascular disease on surgical mortality and morbidity[J]. Lancet, 1996, 348(9034): 1055-1060.
- [13] Carson JL, Terrin ML, Noveck H, *et al.* Liberal or restrictive transfusion in high-risk patients after hip surgery[J]. N Engl J Med, 2011, 365(26): 2453-2462.
- [14] Zarychanski R, Houston DS. Anemia of chronic disease: a harmful disorder or an adaptive, beneficial response[J]? CMAJ, 2008, 179(4): 333-337.
- [15] Foss NB, Kristensen MT, Jensen PS, *et al.* The effects of liberal *versus* restrictive transfusion thresholds on ambulation after hip fracture surgery[J]. Transfusion, 2009, 49(2): 227-234.
- [16] Shokoobi A, Stanworth S, Mistry D, *et al.* The risks of red cell transfusion for hip fracture surgery in the elderly[J]. Vox Sang, 2012, 103(3): 223-230.
- [17] Marik PE, Corwin HL. Efficacy of red blood cell transfusion in the critically ill: a systematic review of the literature[J]. Crit Care Med, 2008, 36(9): 2667-2674.
- [18] Carson JL, Noveck H, Berlin JA, *et al.* Mortality and morbidity in patients with very low postoperative Hb levels who decline blood transfusion[J]. Transfusion, 2002, 42(7): 812-818.
- (编辑: 李菁竹)

• 消 息 •

《中华老年多器官疾病杂志》论文优先发表快速通道

为加快重大医学研究成果的交流推广,促进医学事业的发展,本刊对符合下列条件的论文开设快速通道,优先发表:(1)国家、军队、省部级基金资助项目;(2)其他具有国内领先水平的创新性科研成果论文;(3)相关领域各类最新指南解读。凡要求以“快速通道”发表的论文,作者应提供关于论文科学性和创新性的说明。本刊对符合标准的稿件,可快速审核及刊用。

地址: 100853 北京市复兴路28号,《中华老年多器官疾病杂志》编辑部
电话: 010-66936756
网址: <http://www.mode301.cn>
E-mail: zhlnldqg@mode301.cn