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## · 临床研究 ·

## 术前衰弱对老年心脏手术患者术后跌倒坠床发生率、认知功能和日常生活活动能力的影响分析\*

褚晓傅 饶 徐文婷 叶 菊 陆 真<sup>△</sup>

(江苏省人民医院心脏大血管外科 江苏 南京 210000)

**摘要** 目的:探讨术前衰弱对老年心脏手术患者术后跌倒坠床发生率、认知功能和日常生活活动能力的影响。方法:选择我院 2018 年 1 月~2021 年 1 月收治的 271 例拟行心脏手术的老年患者,按照术前是否合并衰弱情况,将患者分别纳入衰弱组、非衰弱组,对比两组患者术后跌倒坠床发生率、并发症发生率、住院时间及术前、术后认知功能和日常生活活动能力的变化。结果:271 例患者中,共有 78 例(28.78%)符合衰弱判断。衰弱组术后跌倒坠床、并发症发生率高于非衰弱组,其住院时间较非衰弱组更长,差异有统计学意义( $P<0.05$ )。两组患者术后 7 d 简易智力精神状态检查量表(MMSE)评分均较术前下降,衰弱组术后 7 d MMSE 评分低于非衰弱组,差异有统计学意义( $P<0.05$ )。衰弱组术后认知功能障碍(POCD)发生率为 11.54%(9/78),高于非衰弱组的 1.04%(2/193),差异有统计学意义( $P<0.05$ )。两组患者术后 7 d 基础性日常生活活动能力(BADL)及工具性日常生活活动能力(IADL)评分均较术前下降,衰弱组术后 7 d BADL、IADL 评分低于非衰弱组,差异有统计学意义( $P<0.05$ )。结论:合并术前衰弱的老年患者较非衰弱患者心脏手术后跌倒坠床发生率、并发症发生率更高,认知功能、日常生活活动能力受影响越明显,且术后恢复速度更慢。

**关键词:** 衰弱;老年;心脏手术;跌倒坠床;认知功能;日常生活活动能力

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## Effects Analysis of Preoperative Frailty on the Incidence of Falls and Falls in Bed, Cognitive Function and Activities of Daily Living in Elderly Patients Undergoing Cardiac Surgery\*

CHU Xiao, FU Rao, XU Wen-ting, YE Ju, LU Zhen<sup>△</sup>

(Department of Cardiovascular Surgery, Jiangsu Provincial People's Hospital, Nanjing, Jiangsu, 210000, China)

**ABSTRACT Objective:** To analyze the effect of preoperative frailty on the incidence of falls and falls in bed, cognitive function and activities of daily living in elderly patients undergoing cardiac surgery. **Methods:** 271 elderly patients who planned to undergo cardiac surgery in our hospital from January 2018 to January 2021 were selected. According to whether they were combined with frailty before operation, the patients were included in the frailty group and the non-frailty group respectively. The incidence of falls and falls in bed after operation, the incidence of complications, the hospital stay, the cognitive function after operation and activities of daily living changes were compared between the two groups. **Results:** Among 271 patients, 78 (28.78%) were in line with the judgment of frailty. The incidence of postoperative falls, falls in bed and complications in the frailty group was higher than that in the non frailty group, and the hospital stay was longer than that in the non-frailty group, the hospital stay was longer than that in the non-frailty group, and the differences were statistically significant ( $P<0.05$ ). The Mini-Mental State Examination (MMSE) scores of the patients in the two groups at 7 d after operation decreased compared with that before operation, the MMSE scores of the frailty group were lower than those of the non-frailty group at 7 d after operation, and the differences were statistically significant ( $P<0.05$ ). The incidence of postoperative cognitive dysfunction (POCD) in the frailty group was 11.54% (9/78), which was higher than 1.04% (2/193) in the non-frailty group, and the difference was statistically significant ( $P<0.05$ ). The scores of basic activities of daily living (BADL) and instrumental activities of daily living (IADL) in the two groups at 7 d after operation decreased compared with those before operation. The scores of BADL and IADL in the frailty group were lower than those in the non-frailty group at 7 d after operation, and the differences were statistically significant ( $P<0.05$ ). **Conclusion:** Compared with elderly patients with preoperative frailty, the incidence of falls and falls in bed and incidence

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作者简介:褚晓(1991-),女,硕士研究生,从事心血管外科方向的研究,E-mail:xuewuji\_1@163.com

<sup>△</sup> 通讯作者:陆真(1980-),女,本科,副主任医师,从事心血管外科方向的研究,E-mail:luzhen206@163.com

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of complications after cardiac surgery are higher than those in non-weak patients. The cognitive function and activities of daily living are more affected, and the recovery speed is slower.

**Key words:** Frailty; Elderly; Cardiac surgery; Falls and falls in bed; Cognitive function; Activities of daily living

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## 前言

随着手术技术的进步及麻醉管理技术的提高,心脏外科手术后并发症发生率显著下降,且年龄对机体耐受手术、麻醉应激的影响愈发减小,然而,老年患者心脏手术后认知功能障碍(Postoperative cognitive dysfunction,POCD)发生率较高<sup>[1-3]</sup>,严重者可出现谵妄甚至痴呆,也是影响手术安全性及患者日常生活活动能力、预后的重要原因。既往研究显示,合并症、营养状态、血糖水平与老年心血管疾病患者预后有关<sup>[4]</sup>;新近研究发现,衰弱的发生发展不仅使老年患者更易发生跌倒坠床,也使其POCD发生风险大幅上升<sup>[5]</sup>。衰弱患者以机体生理储备功能、应激耐受能力下降为主要生理改变,据报道,约有20%~50%的老年心脏手术患者合并衰弱<sup>[6]</sup>。因此,明确术前衰弱情况对老年心脏手术患者术后跌倒坠床、认知功能和日常生活活动能力的影响,是指导老年心脏手术患者临床干预及不良结局预防的重要前提。为此,本研究选取271例老年心脏手术患者依据是否合并术前衰弱进行了对照研究,现报道如下。

## 1 对象与方法

### 1.1 研究对象

将我院2018年1月~2021年1月收治的271例拟行心脏手术的老年患者纳入此次研究。纳入标准:(1)年龄 $\geq 60$ 岁;(2)拟接受心脏瓣膜置换术治疗;(3)术前简易智力精神状态检查量表(Mini-mental state examination,MMSE)评分 $> 27$ 分;(4)具备配合研究的能力及意愿。排除标准:(1)既往有酗酒史、脑萎缩病史或脑部手术史;(2)合并恶性肿瘤;(3)合并视力、听力障碍。本研究已征得我院医学伦理委员会批准,患者均知情同意并签署书面协议。

### 1.2 衰弱评估和分组方法

使用Fried衰弱表型评估患者衰弱情况<sup>[8]</sup>:(1)过去1年内不明原因体重非自主性下降 $\geq 4.5$  kg;(2)疲乏,过去1周内做

任何事都觉得费劲、缺乏干劲;(3)握力下降;(4)行走速度下降,行走4.6 m花费时间超过7 s;(5)躯体活动降低、体力活动下降,每周运动量低于1603 kJ(男性)或1130 kJ(女性)。符合上述5条中 $\geq 3$ 条,即判定为衰弱,并纳入衰弱组,其余患者纳入非衰弱组。

### 1.3 观察指标

患者均于我院接受心脏手术治疗,手术均由同组医师完成。(1)记录两组患者术后跌倒坠床发生率、并发症发生率及住院时间,其中,术后并发症包括心脏事件、出血、非计划再手术、深静脉血栓形成等;(2)分别于术前、术后7 d评估两组患者MMSE评分变化,术后7 d MMSE评分较术前下降 $\geq 4$ 分即判定为发生POCD。MMSE评分包括时间定向力、地点定向力、即刻记忆、注意力及计算力、延迟记忆、语言、视空间共7个项目,总分0~30分,评分越高则认知功能越佳<sup>[7]</sup>;(3)分别于术前、术后7 d,使用基础性日常生活活动能力(Basic activities of daily living,BADL)、工具性日常生活活动能力(Instrument activities of daily living,IADL)评估两组患者日常生活活动能力。BADL评分包括10个项目,总分0~20分,评分越高则提示躯体生活活动能力越佳<sup>[9]</sup>;IADL评分包括8个项目,总分0~24分,评分越高则提示工具性日常生活活动能力越佳<sup>[10]</sup>。

### 1.4 统计学分析

使用SPSS 22.0统计学软件分析本研究相关数据,计数资料以(例数/百分比)即(n/%)表示,并采用卡方检验( $\chi^2$ 检验),计量资料均符合正态分布,以(平均数 $\pm$ 标准差)即( $\bar{x} \pm s$ )表示,采用双侧t检验,当 $P < 0.05$ 时,认为差异存在统计学意义。

## 2 结果

### 2.1 临床资料比较

271例患者中,共有78例(28.78%)符合衰弱判断,衰弱组、非衰弱组基线资料比较,未见统计学差异( $P > 0.05$ ),具有可比性,见表1。

表1 衰弱组与非衰弱组患者临床资料比较

Table 1 Comparison of clinical data between frailty group and non-frailty group

| Groups            | n   | Age(years)       | BMI(kg/m <sup>2</sup> ) | Gender |        | Complication |          |                        |
|-------------------|-----|------------------|-------------------------|--------|--------|--------------|----------|------------------------|
|                   |     |                  |                         | Male   | Female | Hypertension | Diabetes | Coronary heart disease |
| Frailty group     | 78  | 71.93 $\pm$ 8.25 | 24.97 $\pm$ 2.36        | 41     | 37     | 57           | 25       | 54                     |
| Non-frailty group | 193 | 71.66 $\pm$ 8.17 | 25.14 $\pm$ 2.55        | 105    | 88     | 138          | 57       | 135                    |
| $t/\chi^2$        | -   | 0.246            | 0.507                   | 0.076  |        | 0.068        | 0.167    | 0.014                  |
| $P$               | -   | 0.806            | 0.612                   | 0.783  |        | 0.794        | 0.683    | 0.907                  |

### 2.2 跌倒坠床发生率及住院时间比较

衰弱组术后跌倒坠床发生率高于非衰弱组,其住院时间较

非衰弱组更长,差异有统计学意义( $P < 0.05$ )。见表2。

表 2 两组患者跌倒坠床发生率及住院时间比较

Table 2 Comparison of the incidence of falls and falls in bed and hospital stay between the two groups

| Groups            | n   | Falls and falls in bed | Hospital stay(d) |
|-------------------|-----|------------------------|------------------|
| Frailty group     | 78  | 11(14.10%)             | 14.69± 3.52      |
| Non-frailty group | 193 | 5(2.59%)               | 10.47± 1.69      |
| t/ $\chi^2$       | -   | 11.260                 | 13.309           |
| P                 | -   | 0.001                  | <0.001           |

## 2.3 术后并发症发生率比较

义( $P<0.05$ ),见表 3。

衰弱组术后并发症发生率高于非衰弱组,差异有统计学意

表 3 两组术后并发症发生率比较

Table 3 Comparison of postoperative complications between the two groups

| Groups            | n   | Cardiac events | Hemorrhage | Unplanned reoperation | Deep venous thrombosis | Total incidence |
|-------------------|-----|----------------|------------|-----------------------|------------------------|-----------------|
| Frailty group     | 78  | 5              | 5          | 5                     | 4                      | 19(24.36%)      |
| Non-frailty group | 193 | 3              | 3          | 2                     | 2                      | 10(5.18%)       |
| $\chi^2$          |     |                |            |                       |                        | 21.380          |
| P                 |     |                |            |                       |                        | <0.001          |

## 2.4 认知功能变化

见表 4。衰弱组 POCD 发生率为 11.54%(9/78),高于非衰弱组

两组患者术后 7 d MMSE 评分均较术前下降,衰弱组术后

7 d MMSE 评分低于非衰弱组,差异有统计学意义( $P<0.05$ )。的 1.04%(2/193),差异有统计学意义( $\chi^2=13.152, P<0.05$ )。表 4 两组患者术前、术后 7 d MMSE 评分比较(分,  $\bar{x}\pm s$ )Table 4 Comparison of MMSE scores changes before and 7 d after operation between the two groups(scores,  $\bar{x}\pm s$ )

| Groups            | n   | Before operation | 7 d after operation | t      | P      |
|-------------------|-----|------------------|---------------------|--------|--------|
| Frailty group     | 78  | 27.52± 0.29      | 23.09± 0.55         | 62.925 | <0.001 |
| Non-frailty group | 193 | 27.47± 0.31      | 25.47± 0.48         | 48.626 | <0.001 |
| t                 | -   | 1.224            | 35.404              | -      | -      |
| P                 | -   | 0.222            | <0.001              | -      | -      |

## 2.5 日常生活活动能力变化

组术后 7 d BADL、IADL 评分低于非衰弱组,差异有统计学意

两组患者术后 7 d BADL、IADL 评分均较术前下降,衰弱

义( $P<0.05$ )。见表 5。表 5 两组患者术前、术后 7 d 日常生活活动能力评分比较(分,  $\bar{x}\pm s$ )Table 5 Comparison of activities of daily living scores changes between the two groups before and 7 d after operation(scores,  $\bar{x}\pm s$ )

| Groups            | n   | BADL             |                     | IADL             |                     |
|-------------------|-----|------------------|---------------------|------------------|---------------------|
|                   |     | Before operation | 7 d after operation | Before operation | 7 d after operation |
| Frailty group     | 78  | 5.74± 0.52       | 4.47± 0.62*         | 7.63± 1.15       | 3.32± 0.41*         |
| Non-frailty group | 193 | 5.76± 0.49       | 5.13± 0.46*         | 7.65± 1.90       | 5.01± 0.75*         |
| t                 | -   | 0.299            | 9.627               | 0.087            | 18.785              |
| P                 | -   | 0.765            | <0.001              | 0.931            | <0.001              |

Note: compared with before operation, \* $P<0.05$ .

## 3 讨论

衰弱是老年心脏手术患者常见的合并症,可增加老年患

者的死亡率<sup>[1]</sup>,亦有学者发现,对于经导管行主动脉瓣置换术的老年患者,衰弱严重程度的加剧导致患者 1 年累计病死率的上升,意味着衰弱不仅影响着患者手术结局,也对患者预后存

在严重影响<sup>[12]</sup>。除影响患者预后外,衰弱对老年心脏手术患者术后并发症的影响也值得重视,术后并发症的发生不仅导致患者住院时间延长,也使其转入照护机构风险上升,进而造成家庭经济负担增加,严重时可能影响患者心理状态甚至生活质量<sup>[13-15]</sup>。

本研究结果显示,合并术前衰弱者,其术后并发症发生率高达 24.36%,且住院时间较非衰弱组显著延长,同时,衰弱组也有着更高的跌倒坠床发生率,其可能原因为:术前衰弱患者受到自身身体和精神双重异常状态的影响,表现为身体各肌群活动能力减弱,不能正常的支配运动功能,而精神认知功能的减退导致患者出现定向力障碍、感情淡漠等,加之手术创伤的影响,使得患者术后易出现跌倒坠床的风险<sup>[16-18]</sup>,尤其是对于老年患者而言,跌倒坠床的发生不仅影响着其恢复速度,还可能引发骨折。同时,骨折的发生可能导致患者衰弱状态加剧,形成恶性循环,严重时可能导致患者因术后并发症而失能<sup>[19-21]</sup>。因此,预防老年心脏手术患者尤其是衰弱患者术后跌倒坠床,是临床实践工作中需要注意的重点环节。

老年患者普遍存在大脑皮质神经元数量下降、突触数量减少、结构改变等生理变化,是导致中枢神经系统功能下降、反应时间变慢和认知过程延长的主要原因,这一变化也使老年患者成为心脏手术后 POCD 的高危人群,且部分患者可进展至永久性认知功能损害<sup>[22-24]</sup>。本研究结果示,相较于非衰弱患者而言,衰弱患者 POCD 发生率高达 11.54%,印证了衰弱患者更高的 POCD 发生风险。术前衰弱患者机体应激能力减弱,各器官系统生理功能储备下降,涉及多个生理系统对压力的不适应反应,进而导致动态稳态的丧失,衰弱的病理过程包括慢性炎症和免疫激活,而这些因素作用于患者的神经系统则可导致患者出现认知功能障碍<sup>[25-26]</sup>。有研究指出,术后并发症、跌倒坠床的发生,也使患者对手术的顾虑、恐惧感升高,并可能影响患者治疗依从性,进而引发 POCD<sup>[27,28]</sup>。因此,预防患者术后跌倒坠床发生也是降低 POCD 风险的关键环节。同时,衰弱发生发展对患者生活能力、生活质量的影响也不容忽视。本研究结果显示,与非衰弱组相比,衰弱组患者术后基础性、工具性日常生活能力下降均更为明显,这是因为患者术前衰弱的发生可引起全身多个器官功能的减退,使参与骨骼肌调节的激素合成代谢异常引起肌少症,进而使得患者的力量、耐力、步行能力和活动水平下降,同时患者受到心脏手术创伤的影响,使得机体活动功能进一步减退,由此患者术后易出现日常生活活动能力下降<sup>[29,30]</sup>。这一变化不仅影响着患者术后恢复,也与患者 POCD 的发生发展有关。因此,对于合并衰弱的老年心脏手术患者而言,需强调运动干预、营养治疗等综合干预,尽可能纠正衰弱症状后开展择期手术,以保障手术安全性、促进术后恢复,同时,对于存在衰弱风险的患者而言,亦应强调衰弱的防治,以避免衰弱对患者预后产生负面负面影响。

综上所述,合并术前衰弱的老年患者,心脏手术后较非衰弱患者跌倒坠床率、并发症发生率更高,认知功能、日常生活活动能力受影响越明显,且术后恢复速度更慢。因此,应强调老年心脏手术患者术前衰弱情况的评估与干预,尽可能改善患者衰弱状态或预防衰弱所致不良手术结局。

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