

中老年人群跌倒风险与年龄的相关性研究

朱秀芬 林华

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摘要: **目的** 探讨中老年人群跌倒风险与年龄之间的关系。**方法** 选取 2008 年 09 月至 2010 年 02 月期间在南京市鼓楼医院体检和就诊并初次接受平衡测定的年龄在 50 ~ 90 岁的 900 人作为研究对象,其中包括男性 268 名,女性 632 名,排除对骨代谢有显著影响的病史和药物应用史,所有患者均无活动性的呼吸、消化、心血管、内分泌、免疫、血液系统疾病及骨关节病等。记录患者的出生年月、身高、体重、年龄及既往跌倒和骨折情况,并对相关数据进行统计学分析。**结果** 跌倒风险与年龄存在相关性($r = 0.013 - 0.567, P < 0.05$);按跌倒指数(FI)比较发现随跌倒风险增高,年龄呈递增趋势,存在统计学差异;回顾既往跌倒史和骨折史发现,两者之间存在显著关联,有跌倒史和骨折史者平均年龄、跌倒指数(FI)均显著高于对照组;骨折史与年龄、FI、跌倒史呈正显著相关。**结论** 跌倒风险受到人群年龄、体重、BMI、骨量等多因素影响,其中年龄对跌倒风险的影响最为显著;跌倒风险的增加与骨折发生率的升高密切相关,可以将其作为骨折风险的一项独立预测因素,对骨折进行有效预测和早期干预。

关键词: 跌倒风险; 骨质疏松; 骨密度; 骨折

The relationship between age and the falling risk in the middle-age and elderly population ZHU Xiufen, LIN Hua. Department of Orthopedics, The Affiliated Drum Tower Hospital of Nanjing University Medical School, Nanjing 210008, China

Corresponding author: ZHU Xiufen, Email: zxf836301@126.com

Abstract: Objective To explore the relationship between age and the falling risk in the middle-age and elderly population. **Methods** Nine hundred 50 – 90 years old patients examined and treated in Nanjing Drum Tower Hospital from September 2008 to February 2010 were chosen as the research subjects, including 268 males and 632 females. The patients with bone metabolism diseases and drug history were excluded. All patients had no active diseases in respiratory, digestive, cardiovascular, endocrine, immune, blood, and bone and joint systems. The date of birth, height, weight, age, and previous falls and fractures were recorded. All data were analyzed statistically. **Results** The falling risk was associated with age ($r = 0.013 - 0.567, P < 0.05$). According to the results of falling index (FI), age increased along with the increasing of falling risk, and the difference was statistically significant. The previous falling and fracture history were retrospectively reviewed. The results showed that the previous falling and fracture history was associated with age. The average age and FI of patients with falling and fracture history were higher than those of the control patients. The fracture history was positively associated with age, FI, and falling history. **Conclusion** The increasing of falling risk is affected by age, height, BMI, and bone mass. The effect of age on the falling risk is most significant. The increase of falling risk is associated with the fracture. The falling risk can be an independent predictive factor for fracture risk to predict the fracture effectively, and to prevent it in the early stage.

Key words: Falling risk; Osteoporosis; Bone mineral density; Fracture

跌倒是指身体的任何部位(不包括双脚)因失

去平衡而意外地触及地面或其他低于平面的物体,是老年人群常见的伤害之一^[1,2]。跌倒降低了老年人的活动能力,并可导致严重的生理、心理或社会功能障碍,是老年人伤残、死亡和经济负担加重的重要

原因之一^[3]。据不完全统计,每年在 65 岁以上的老人中约有 30% 至少发生一次跌倒,其中近半数有再次发生跌倒的可能^[4]。跌倒可造成骨折,特别在骨质疏松的人群,骨折几率大大增加,在老年人中,约 90% 的髌部骨折由跌倒所致,约 12% ~ 20% 的病例中髌部骨折的结局是死亡^[5-8];老年人跌倒受多因素影响,且跌倒风险随危险因素的增多而增加。

本研究运用 Tetrax 平衡测量系统对中老人群的跌倒风险进行初步评估,对受试者年龄、身高、体重以及既往跌倒史、骨折史等参数进行统计和相关性分析研究,探讨中老年人跌倒风险与年龄之间的关系,评价跌倒风险预测对骨质疏松防治工作的意义,促进人们对骨质疏松症和跌倒危害的认识和重视,提高该病日常诊疗和研究工作的水平,从而达到积极预防,早期诊治,全面提高人类生活质量的目 的。

1 对象和方法

1.1 研究对象

选取 2008 年 9 月至 2010 年 02 月期间在南京市鼓楼医院骨质疏松症专病门诊体检,并初次接受平衡测定的年龄在 50 ~ 90 岁的 900 人作为研究对象,其中包括男性 258 名,女性 632 名,已排除对骨代谢有显著影响的病史(包括原发性甲状旁腺功能亢进症、Cushing's 征、甲状腺功能亢进症、垂体疾病、1 型糖尿病、系统性红斑狼疮、类风湿性关节炎、干燥综合征、吸收不良综合征、长期营养不良、肾性骨营养不良、白血病、淋巴瘤、多发性骨髓瘤、器官移植术、肌营养不良症及各种原因所致的偏瘫、截瘫、运动功能障碍等)和药物应用史者(包括激素、抗凝剂、抗抑郁及抗癫痫类药物等),且所有患者均无活动性的呼吸、消化、心血管、内分泌、免疫、血液等系统疾病及骨关节病。事先通过充分的医患沟通,受试者愿意如实提供既往的病史资料。

1.2 研究方法

1.2.1 记录受试者基本情况

- ①年龄:按出生日期计算出患者的具体周岁。
- ②体重:采用标准体重称量仪。使用前检验其准确性和灵敏度。准确度要求每公斤误差小于 0.1 kg。
- ③身高:采用标准身高计。使用前应用钢尺校正,1 m 误差小于 0.1 cm。体重指数:体重指数(BMI) = 体重(kg)/身高(m²)。

1.2.2 跌倒风险评估

采用以色列进口的 Tetrax 平衡测试系统分别检

测受试者在自然站立(NO)、闭眼自然站立(NC)、脚垫站立(PO)、脚垫闭眼站立(PC)、脚垫闭眼头向右转站立(HR)、脚垫闭眼头向左转站立(HL)、脚垫闭眼头向上仰站立(HB)、脚垫闭眼头向下俯站立(HF)8 种不同测试状态下的平衡稳定性,经专业评估软件计算机综合分析后得出跌倒指数(FI),完成对跌倒风险的量化评估。FI 数值越大,表明受试者身体平衡协调控制能力越差,跌倒风险则越高。根据测量标准,FI 低于 36 为正常,在 36 ~ 58 之间为中度风险,高于 58 为高度风险。

1.2.3 病史采集

由专人负责受试者既往病史信息进行回顾性调查并记录在册。询问内容包括患者既往健康状况,各系统相关病史,主要针对可能影响患者平衡能力的病史,包括视力下降、糖尿病、高血压、类风湿性关节炎、脑血管病史、病史等,重大手术、外伤史,骨折史,跌倒史及用药史,特别关注激素、神经精神类药物的使用情况,妇女还需询问月经生育史等。

1.2.4 统计分析

采用 Excel 软件进行资料的数据管理,采用 SPSS 11.0 进行统计分析,以 0.05 为检验水准。为了限制其他危险因素的影响,如体重、身高,所以采用了体重指数在 20 ~ 25 kg/m²之间的受检者的信息进行分析,主要将跌倒指数与年龄(岁),进行二元线性相关分析($P < 0.05$)。

2 结果

2.1 受试者临床基本信息

共计 900 名受试对象,其各项临床基本参数如表 1。其中男性 268 位(29.8%),女性 582 位(70.2%),根据临床诊断标准,其中 776 位(86.2%)受试者的体重指数在 20 ~ 25 kg/m²之间,所以采用了这 776 位受试者的信息。详细询问这些受试者的既往病史,其中有 271(34.9%)例受试者报告有过跌倒史,286 例(36.8%)受试者报告有过骨折史(包括身体各个部位骨折)。

表 1 受试者临床基本信息

	最小值	最大值	平均值(±标准误)
年龄(year)	50	90	68.43 ± 11.05
身高(m)	1.32	1.82	1.58 ± 0.08
体重(kg)	38.2	90.1	61.25 ± 9.81
BMI(体重指数)	15.22	36.07	24.35 ± 3.15
跌倒指数(FI)	2	100	42.35 ± 26.76

2.2 跌倒指数与年龄的相关性分析

首先,对跌倒指数与年龄进行二元变量相关性

分析,结果显示年龄与 FI 的相关性较大, r 值为 0.296,且 P 值 <0.001 。

2.3 按受试者既往有无跌倒史进行分组比较

根据受试者提供的病史资料,按既往有无跌倒史分为两组(跌倒组 271 人,对照组 569 人)进行比较,发现两组受试者体重指数无明显差异,而跌倒组平均年龄和骨折发生率显著高于对照组, $P < 0.001$ 。详见表 2。

2.4 按受试者既往有无骨折史进行分组比较

根据受试者提供的病史资料,对受试者既往骨折情况与各参数进行相关性分析比较,发现骨折的发生与年龄、跌倒指数表现出显著正相关。详见表 3。

表 2 受试者既往跌倒史分类比较

分组	跌倒组	对照组
年龄(岁)	72.50 ± 9.22 **	63.54 ± 10.68
FI	64.32 ± 27.22 **	31.89 ± 19.13
骨折史(组内比例)	197 例(68.9%) **	89 例(31.1%)

注:与对照组比较, ** $P < 0.001$

表 3 受试者既往骨折史分类比较

分组	骨折组	对照组
年龄(岁)	71.00 ± 9.09 **	63.23 ± 11.18
FI	47.90 ± 29.56 **	38.46 ± 23.89
跌倒史(例)	215 **	56

注:与对照组比较, ** $P < 0.001$

3 讨论

本项研究验证了 Tetrax 平衡测试系统良好的跌倒风险评估能力,回顾患者 5 年内发生的跌倒史,发现年龄与跌倒指数 FI 之间存在显著相关性。

通过本项研究发现在中老年人群中,跌倒风险与多因素相关,其中年龄对跌倒的影响最为显著。这与老年人自身躯体平衡协调机能和对周围环境的应激反应能力下降密切相关。躯体平衡协调能力属于内因,人体保持平衡主要是靠本位感觉、前庭感觉、视觉三大感觉传入系统、中枢神经系统和骨骼肌肉运动系统共同协调来完成的,而随着年龄增大,上述生理机能不同程度减退,造成步态的协调性、平衡的稳定性和骨骼肌肉支撑力量下降,导致跌倒风险增加^[9-12]。环境因素属于外因,其危险性取决于老年人周围环境的危险程度和其对环境的适应能力^[13-17]。有研究表明内因是造成体质虚弱、需人看护的老人跌倒的主要原因,虚弱的老年人通常在家中的日常活动中发生跌倒,而对于精力充沛、活动积极的老年人,跌倒则多系环境因素所致,常在非日常

活动时发生跌倒^[18-22]。

与其他研究一致^[23-35],本研究针对骨折史的回顾分析发现,年龄增大、跌倒指数增高是骨折发生的重要危险因素,骨折的发生还会导致身高缩短,严重影响患者的身心健康和生活质量。年老者各方面生理功能退化,疾病增多,骨骼脆弱、机体反应能力下降等都会引起骨折风险的增加。体型偏瘦者容易骨折是由于肢体缺乏脂肪包裹,在跌倒时软组织的缓冲作用减弱,使骨折风险加大。无论男女,肢体骨折危险性与跌倒的发生率明显相关。所以,为有效降低骨质疏松性骨折风险,还应全面预防跌倒。

4 结论

跌倒会降低老年人的活动能力,严重影响老年人的生理、心理健康,是老年人伤残、死亡和经济负担加重的重要原因。综上所述,跌倒风险与中老年人的年龄存在显著关联。虽然骨质疏松目前尚无法根本治愈,但针对骨质疏松性骨折的危险因素进行早期评估和积极干预,可以有效地降低骨折的发生。由于老年人跌倒的危险因素本身存在多因性,且跌倒风险随危险因素的增多而增加^[26-27],因此需要广泛全面的对老年人跌倒风险进行早期评估和及时干预,并根据个体差异提出针对性的指导意见^[28-31]。鉴于年龄与跌倒风险之间存在密切的相关性。同时本研究中应用的 Tetrax 平衡测量系统是目前较为可靠的跌倒风险评估工具,由于其操作过程简便无创,测试耗费时间短(平均一名患者完成整个检查过程只需 10 分钟左右),患者接受度良好,配合性高,在临床工作中具有良好的应用价值,对骨质疏松诊疗水平的提高及骨折风险的预测具有积极的作用。因此作者认为在今后的临床工作中可以针对这一相关性对患者提出相应的指导意见,如适当的体育锻炼方式,有效的辅助行走器械等等。

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作者: 朱秀芬, 林华, [ZHU Xiufen](#), [LIN Hua](#)
作者单位: [南京大学附属鼓楼医院骨病中心, 南京, 210008](#)
刊名: [中国骨质疏松杂志](#) **ISTIC**
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