

骨密度预测脊柱和髋部脆性骨折先后性的研究

袁赤亭 李芷嫣[▲] 章礼炜 洪盾

浙江省台州医院骨科,浙江临海 317000

[摘要] 目的 通过观察分析髋部(股骨颈)和脊柱(胸腰椎)脆性骨折患者的骨密度值,探讨骨密度预测髋部和脊柱脆性骨折风险。方法 采用回顾性研究方法,收集 2017 年 1 月至 2018 年 12 月浙江省台州医院符合纳入标准的股骨颈与胸腰椎脆性骨折患者的临床资料 98 例,按骨折史分为股骨颈组 53 例和胸腰椎组 45 例,比较两组致伤因素、骨密度及跌倒致伤因素下骨密度差异。结果 两组致伤因素比较,股骨颈组跌倒最多,为 84.25%,与胸腰椎组的 39.16%比较,差异有统计学意义($P=0.002$);胸腰椎组无明显外伤病史患者较多,与股骨颈组比较,差异有统计学意义($P=0.033$);两组暴力致伤因素比较,差异无统计学意义($P>0.05$)。胸腰椎组腰椎 T 值为 (-3.66 ± 0.89) ,与股骨颈 T 值的 (-2.56 ± 0.73) 比较,差异有统计学意义($P=0.006$);胸腰椎组 ΔT 为 (-1.10 ± 0.91) ,股骨颈组 ΔT 为 (-0.28 ± 0.76) ,两组比较,差异有统计学意义($P=0.001$);其余指标比较,差异无统计学意义($P>0.05$)。跌倒致伤因素下,胸腰椎组腰椎 T 值为 (-3.07 ± 0.78) ,股骨颈 T 值 (-1.94 ± 0.08) ,两者比较,差异有统计学意义($P=0.003$);两组股骨颈 T 值比较,差异有统计学意义($P=0.002$);两组 ΔT 比较,差异有统计学意义($P=0.000$);其余指标比较,差异无统计学意义($P>0.05$)。结论 对于老年患者,跌倒更容易出现脆性骨折;腰椎与股骨颈骨密度差值越大,越容易出现胸腰椎骨折,反之更容易出现股骨颈骨折。

[关键词] 骨密度;髋部骨折;脊柱骨折;脆性骨折

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Study on bone mineral density in predicting the sequence of spinal or hip fragility fractures

YUAN Chiting LI Zhiyan ZHANG Liwei HONG Dun

Department of Orthopedics, Taizhou Hospital of Zhejiang Province, Linhai 317000, China

[Abstract] Objective To observe and analyze the bone mineral density of patients with fragility fractures of the hip (femoral neck) and spine (thoracolumbar spine), and to predict the risk of fragility fractures of the hip and the spine.

Methods Retrospective research method was used, the patients with fragility fractures of the femoral neck and thoracolumbar spine who met the inclusion criteria from January 2017 to December 2018 in Taizhou Hospital of Zhejiang Province were collected. A total of 98 subjects were included. According to the fracture history, they were divided into 53 cases in the femoral neck group and 45 cases in the thoracolumbar spine group. The injury factors and bone density were compared between the two groups, the differences in bone mineral density between the two groups were analyzed under the injury factors of falls. **Results** Among the injury factors, the femoral neck group had the most falls (84.25%), which was significantly different from the thoracolumbar spine group(39.16%) ($P=0.002$); the thoracolumbar spine group had more cases of no history of trauma, which was significantly different from the femoral neck group ($P=0.033$). There was no statistically significant difference in violence factors between groups ($P>0.05$). In terms of bone mineral density, there was a significant difference between the femoral neck T value (-2.56 ± 0.73) and the lumbar bone mineral density T value (-3.66 ± 0.89) in the thoracolumbar spine group ($P=0.006$). The ΔT value in the thoracolumbar spine group was (-1.10 ± 0.91) , and the ΔT value in the femoral neck fracture group was (-0.28 ± 0.76) . There was a significant difference in the ΔT values between the two groups ($P=0.001$), there was no difference in other values ($P>0.05$). There was a statistically significant difference between the femoral neck T value (-1.94 ± 0.08) and the lumbar spine T value (-3.07 ± 0.78) in the thoracolumbar spine group during a fall ($P=0.003$), the ΔT value in both groups with significant difference ($P=0.000$), there was no difference in other values ($P>0.05$). **Conclusion** In elderly patients, falls are more likely to cause fragility fractures. The greater the difference in bone mineral density between the lumbar spine and the femoral neck, the more likely thoracolumbar fractures will appear. Otherwise, the femoral neck fractures will be more likely to appear.

[Key words] Bone mineral density; Hip fractures; Spinal fractures; Fragility fractures

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▲通讯作者

骨质疏松症是一种以骨量降低、骨微结构破坏、骨脆性增加、骨强度下降、骨折风险性增大为特征的全身性、代谢性骨骼系统疾病,而骨质疏松的最大危害是骨折,其致残率、致死率均较高^[1-2]。随着我国人口老龄化加剧,骨质疏松性骨折患者数量也在逐年增加^[3]。预测骨折发生风险对骨质疏松症患者具有重要意义,而骨密度对骨折风险的预估价值是当前研究的发展趋势^[4-6]。骨质疏松容易导致骨折,不同部位骨折对患者生活质量和治疗费用不同,尤其出现在髌部和胸腰椎的骨折,两者均需要手术治疗,但其治疗费用和预后差别很大,因此,预测两者骨折发生的先后性至关重要。本研究探讨老年脊柱和髌部脆性骨折与骨密度值变化的相关性,对其骨密度值变化规律进行分析,为临床积极预测和预防骨质疏松性骨折提供依据,以降低骨质疏松性骨折发生的风险,现报道如下。

1 资料与方法

1.1 一般资料

采用回顾性研究方法,收集 2017 年 1 月至 2018 年 12 月浙江省台州医院符合纳入标准的股骨颈与胸腰椎脆性骨折患者的临床资料 98 例,按骨折史分为股骨颈组 53 例和胸腰椎组 45 例。股骨颈组女性占 84.2%,平均年龄(77.12±12.34)岁;胸腰椎组女性占 61%,平均年龄(75.28±8.37)岁。两组一般资料比较,差异无统计学意义($P>0.05$),具有可比性。见表 1。纳入标准:①所有受试者为脆性骨折(脆性骨折指受到轻微创伤或日常活动中即发生的骨折,常见部位是椎体、髌部、前臂远端、肱骨近端和骨盆);②单纯股骨颈骨折或胸腰椎骨折;③符合原发性骨质疏松症诊断;④绝经后女性或年龄大于 50 岁的男性。排除标准:①因严重暴力(车祸、高处坠落等)导致的胸腰椎或髌部骨折;②双髌骨折术后均有假体、钢板或螺钉等植入;③胸腰椎有内固定或椎体成形术后;④因肿瘤、使用化疗药物或糖皮质激素等继发性的骨质疏松症;⑤有类风湿性关节炎、股骨头缺血性坏死、畸形性骨炎、成骨不全等严重影响脊柱或髌部骨骼形态的既往史^[7]。本研究经医院医学伦理委员会批准,所有患者签署知情同意书。

表 1 两组一般资料比较

组别	n	女性比例 (%)	年龄 ($\bar{x}\pm s$, 岁)	身高 ($\bar{x}\pm s$, cm)	体重 ($\bar{x}\pm s$, kg)
股骨颈组	53	84.20	77.12±12.34	164.25±13.58	62.75±9.12
胸腰椎组	45	61.00	75.28±8.37	157.78±12.22	54.89±6.82
χ^2/t 值		1.467	0.509	1.730	1.431
P 值		0.226	0.132	0.106	0.180

1.2 方法

采用美国 Prodigy 公司的 Priomo 型双能 X 线骨密度仪,检测患者常规正位腰 1~4 椎体平均值及股骨颈的骨密度值(检查股骨颈骨折患者对侧股骨颈的骨密度,腰椎骨折患者在分析前将相应骨折椎体剔除),测定后自动与系统数据库进行比对、计算并得出 T 值(即测得 BMD 值与同性别的正常人群 BMD 峰值比较得出的值)^[8], ΔT 为腰椎 T 值与股骨颈 T 值的骨密度差值。

1.3 统计学方法

应用 SPSS 19.0 统计学软件进行数据分析,计量资料用($\bar{x}\pm s$)表示,采用 t 检验;计数资料用[n(%)]表示,采用 χ^2 检验, $P<0.05$ 为差异有统计学意义。

2 结果

2.1 两组致伤因素比较

两组致伤因素比较,股骨颈组跌倒最多,为 84.25%,与胸腰椎组的 39.16%比较,差异有统计学意义($P=0.002$);胸腰椎组无明显外伤病史患者较多,与股骨颈组比较,差异有统计学意义($P=0.033$);两组暴力致伤因素比较,差异无统计学意义($P>0.05$)。见表 2。

表 2 两组致伤因素比较(%)

组别	n	无	跌倒	暴力
股骨颈组	53	10.51	84.25	5.24
胸腰椎组	45	50.08	39.16	10.76
χ^2 值		5.462	7.975	3.243
P 值		0.033	0.002	0.189

2.2 两组骨密度比较

胸腰椎组腰椎 T 值为(-3.66±0.89),与股骨颈 T 值的(-2.56±0.73)比较,差异有统计学意义($P=0.006$);胸腰椎组 ΔT 为(-1.10±0.91),股骨颈组 ΔT 为(-0.28±0.76),两组比较,差异有统计学意义($P=0.001$);其余指标比较,差异无统计学意义。见表 3。

2.3 两组跌倒致伤因素下骨密度比较

跌倒致伤因素下,胸腰椎组腰椎 T 值为(-3.07±0.78),股骨颈 T 值(-1.94±0.08),两者比较,差异有统计学意义($P=0.003$);两组股骨颈 T 值比较,差异有统计学意义($P=0.002$);两组 ΔT 比较,差异有统计学意义($P=0.000$);其余指标比较,差异无统计学意义。见表 4。

3 讨论

老年性骨质疏松症最常见的危害在于脆性骨折,脆性骨折最常见的发生部位为脊柱、髌部、肱骨近端

表 3 两组骨密度比较($\bar{x}\pm s$)

组别	n	腰椎 BMD 值(g/cm ²)	股骨颈 BMD 值(g/cm ²)	腰椎 T 值	股骨颈 T 值	t 值	P 值	ΔT
股骨颈组	53	0.78±0.10	0.63±0.09	-3.19±0.73	-2.84±0.69	1.254	0.132	-0.28±0.76
胸腰椎组	45	0.71±0.11	0.67±0.06	-3.66±0.89	-2.56±0.73	4.026	0.006	-1.10±0.91
t 值		2.175	1.202	1.734	1.525			2.928
P 值		0.321	0.279	0.096	0.156			0.001

表 4 两组跌倒致伤因素下骨密度比较($\bar{x}\pm s$)

组别	n	腰椎 T 值	股骨颈 T 值	t 值	P 值	ΔT
股骨颈组	53	-3.23±0.69	-2.97±0.12	1.226	0.187	-0.26±0.71
胸腰椎组	45	-3.07±0.78	-1.94±0.08	3.796	0.003	-1.13±0.84
t 值		0.446	4.073			4.328
P 值		0.384	0.002			0.000

及桡骨远端等^[9]。其中以脊柱和髌部骨折的后果最为严重、伤残率最高,甚至可因系统性合并症而危及生命,因此,预测和预防脆性骨折对骨质疏松症患者具有重要意义^[10-11]。目前,骨质疏松骨折的风险预测主要采用骨折风险预测工具(FRAX)软件^[12],由于 FRAX 对骨质坚硬程度的代表性较骨密度弱,且存在针对性差、操作复杂等缺点,难以普及,双能 X 线骨吸收测定(DXA)检测骨密度是评估骨质疏松风险最常用的工具^[13-14],但目前骨密度预测哪个部位优先出现脆性骨折无相关报道,因此,本研究探讨通过检测骨密度以预测髌部和脊柱出现脆性骨折风险的可行性。

本研究回顾了近两年本院骨质疏松性骨折患者的一般资料、致伤原因及骨密度等情况,包括股骨颈骨折和胸腰椎骨折。本研究结果显示,两组致伤因素比较,股骨颈组跌倒最多,胸腰椎组无明显外伤史患者较多。胸腰椎组腰椎 T 值与股骨颈 T 值比较,差异有统计学意义($P<0.05$);两组 ΔT 比较,差异有统计学意义($P<0.05$),提示在股骨颈和胸腰椎脆性骨折中,骨密度检测可以预测哪个部位先出现脆性骨折的风险更高。由于骨密度(BMD)决定了骨强度的 70%,因此,骨密度是一个评估骨折风险的客观指标,研究结果显示,BMD 下降 1 SD,骨折风险增加 1.5~3.0 倍^[15],DXA 骨密度测定仪在检测 BMD 的同时,能提示骨折的风险程度,本研究中,胸腰椎骨折组腰椎比股骨颈 T 值降低超过 1 SD,故该组患者出现胸腰椎骨折的风险比股骨颈骨折高 1.5 倍,即患者容易出现胸腰椎骨折。因此,骨密度不仅能评估患者的骨折风险,而且能预测胸腰椎和股骨颈两者骨折风险的高低,更有助于诊断骨质疏松,指导临床抗骨质疏松治疗。

本研究结果显示,老年胸腰椎和股骨颈骨折的致伤原因中,跌倒的比例最高,提示老年脆性骨折主要由跌倒引起^[16]。跌倒致伤因素下,胸腰椎组腰椎 T 值与股骨颈 T 值比较,差异有统计学意义($P<0.05$);两组股骨颈 T 值比较,差异有统计学意义($P<0.05$);两

组 ΔT 比较,差异有统计学意义($P<0.05$),提示跌倒患者 ΔT 值越大,越容易出现胸腰椎骨折;ΔT 值差值越小,越容易出现股骨颈骨折。因此,骨密度在一定程度上可预测跌倒后脊柱和髌部哪个部位更容易出现脆性骨折,有助于指导临床及时进行干预,预防跌倒及骨折的发生。

预测跌倒与脆性骨折风险有助于识别并保护骨折危险人群^[17],对高危个体危险因素的分析及监护可以达到降低发生骨质疏松骨折的目的^[18]。本研究结果显示,股骨颈组致伤因素主要为跌倒,而胸腰椎组以无明显外伤史者为主,提示骨密度差值可以预测脆性骨折的危险因素,便于在生活中进行预防,减少脆性骨折发生。预测高危人群,对其实施监护与干预是预防跌倒及骨折最重要的方法,骨密度有助于诊断和骨折风险预测,在一定程度上预测高危人群,指导临床及时做好干预措施,相关研究也已经证实,预防干预是降低跌倒和骨折风险的最有效措施^[19-20]。

综上所述,老年患者容易出现胸腰椎和股骨颈的脆性骨折,而骨密度有助于脆性骨折的诊断,更有助于骨折风险预测,并指导临床早期干预、降低骨折风险。在跌倒患者中,腰椎与股骨颈之间骨密度差值越大,尤其超过 1 SD 时,更容易出现胸腰椎骨折,反之更容易出现股骨颈骨折,提示骨密度在一定程度上可以预测跌倒后容易出现骨折的部位,从而指导完善预防跌倒的相关措施,并有助于临床及时诊断,预防干预是降低跌倒和骨折风险的最有效措施。

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