

绝经后妇女肥胖与骨密度的关系

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摘要: **目的** 分析绝经后妇女的腰椎 2-4(L₂₋₄)和股骨颈(Neck)、大转子(Troch)、粗隆间(InterTro)的骨密度(BMD),探讨绝经后妇女肥胖与骨密度的关系。**方法** 以我院 269 名年龄 45-75 岁的绝经后妇女为研究对象,计算体重指数将研究对象分为肥胖组和对照组,采用双能 X 线骨密度仪检测腰椎、股骨颈、大转子、粗隆间的骨密度,分析绝经后妇女肥胖与骨密度的关系。**结果** 肥胖组绝经后妇女不同部位的骨密度均高于对照组($P < 0.05$ 或 $P < 0.01$)。绝经后妇女各部位的骨密度随年龄的增长而降低,各年龄组间的骨密度有显著性差异($P < 0.05$ 或 $P < 0.01$)。**结论** 年龄和体重指数是影响骨密度的重要因素,绝经后妇女肥胖者骨密度较正常体型者高,肥胖者可能通过负重等作用,延缓绝经后妇女骨密度的下降。

关键词: 绝经后妇女;肥胖;骨密度

The relationship between obesity and bone mineral density in postmenopausal women

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Abstract: Objective To analyze bone mineral density (BMD) of the lumbar spine (L₂₋₄), the femoral neck (Neck), the greater trochanter (Troch), and the intertrochanter (InterTro) in postmenopausal women, and to explore the relationship between obesity and bone mineral density in postmenopausal women. **Methods** The research subjects were 269 postmenopausal women aging from 45 to 75 years old. The subjects were divided into control group and obese group according to their BMI. BMD of the lumbar spine, the femoral neck, the greater trochanter, and the intertrochanter were measured using dual energy X-ray absorptiometry. The relationship between obesity and bone mineral density in postmenopausal women was analyzed. **Results** BMD of subjects in obese group were significantly higher than those in the control group ($P < 0.05$ or $P < 0.01$). BMD of different sites in postmenopausal women decreased with the increase of age. BMD was significantly different among all age groups ($P < 0.05$ or $P < 0.01$). **Conclusion** Age and BMI are important factors for BMD. BMD of subjects in obese group is significantly higher than that in control group. Obesity may prevent BMD decrease in postmenopausal women through many factors such as greater physical loading.

Key words: Postmenopausal women; Obesity; Bone mineral density

骨质疏松症是一种以骨量降低和骨组织微结构破坏为特征,导致骨脆性增加和易于骨折的代谢性骨病。随着人口的老齡化,骨质疏松已成为威胁老年人尤其是绝经后妇女健康的主要疾病之一^[1]。本研究对在我院进行健康体检的 269 名绝经后妇女的双能 X 线骨密度仪测量结果进行分析,探讨绝经后妇女肥胖与骨密度的关系,为绝经后妇女骨质疏

松的预防提供了临床参考。

1 对象和方法

1.1 研究对象

对 269 名在长沙市第一医院进行健康体检的绝经后妇女进行骨密度检测,受检者年龄 45~75 岁。对所有绝经后妇女,通过体检和问诊排除其内分泌、肾脏疾病和其他影响骨代谢的因素。

1.2 研究方法

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1.2.1 一般指标测定:收集年龄,绝经年龄信息,计算绝经年限,绝经年限 = 年龄 - 绝经年龄(单位:年)。

1.2.2 骨密度测定:采用法国 MEDILINK 公司 OSTEOCORE 双能 X 线骨密度仪,检测腰椎 2-4 (L₂₋₄)、股骨颈 (Neck)、大转子 (Troch)、粗隆间 (InterTro) 骨密度 (bone mineral density, BMD),每日测量前均进行机器质量控制。

1.2.3 分组:①按照 BMI 分组:分别记录受检者的身高和体重,并计算体重指数 (body mass index, BMI), BMI = 体重 (kg) / 身高 (m²),按照 BMI 相关标准把受检者分为:肥胖组 (BMI ≥ 25 kg/m²) 118 例和对照组 (18.5 ≤ BMI < 25 kg/m²) 151 例。②按年龄分组:以 10 岁为等级来分组,分为 45 ~ 54 岁组、

55 ~ 64 岁组和 65 ~ 75 岁组。

1.3 统计学处理

采用 SPSS16.0 统计软件进行 t 检验分析,比较肥胖组和对照组间各项指标的变化情况,计量资料以 $\bar{x} \pm s$ 表示。P < 0.05 认为差异有统计学意义。

2 结果

2.1 研究对象的基本情况

表 1 显示,肥胖组和对照组之间体重指数有显著的差异 (P < 0.01),年龄、绝经年龄和绝经年限无显著的差异 (P > 0.05)。说明肥胖组和对照组之间研究不同体重指数对骨密度的影响具有良好的可比性。

表 1 肥胖组和对照组各项指标的比较 ($\bar{x} \pm s$)

Table 1 Comparison of different indicators between obese group and control group

组别 groups	例数 n	年龄 (岁) age	绝经年龄 (岁) menopausal age	绝经年限 (年) Duration of menopause	体重指数 BMI (kg/m ²)
对照组 control group	151	57.71 ± 7.41	48.03 ± 3.67	9.68 ± 8.35	22.11 ± 1.87
肥胖组 obese group	118	58.49 ± 7.05	48.52 ± 4.05	9.97 ± 7.58	27.15 ± 1.53**

注: ** P < 0.01, 肥胖组与对照组比较。Note: ** P < 0.01, obese group compared with control group.

2.2 肥胖组和对照组不同部位的骨密度比较

密度均高于对照组 (P < 0.05 或 P < 0.01)。

由表 2 可知,肥胖组绝经后妇女不同部位的骨

表 2 肥胖组和对照组不同部位的骨密度比较 (g/cm², $\bar{x} \pm s$)

Table 2 Comparison of bone mineral density of different sites between obese group and control group

组别 groups	例数 (n)	L ₂	L ₃	L ₄	股骨颈 Neck	大转子 Troch	粗隆间 InterTro
对照组 control group	151	0.752 ± 0.141	0.786 ± 0.149	0.826 ± 0.153	0.585 ± 0.104	0.574 ± 0.105	0.839 ± 0.136
肥胖组 obese group	118	0.802 ± 0.171**	0.840 ± 0.214*	0.898 ± 0.242**	0.674 ± 0.126**	0.612 ± 0.117**	0.932 ± 0.156**

注: * P < 0.05, ** P < 0.01, 肥胖组与对照组比较。Note: * P < 0.05, ** P < 0.01, obese group compared with control group.

2.3 不同年龄对绝经后妇女骨密度的影响

由表 3 可知,绝经后妇女各部位的骨密度随年龄的增长而降低,各年龄组间的骨密度有显著性差异 (P < 0.05 或 P < 0.01)。

由表 3 可知,绝经后妇女各部位的骨密度随年

表 3 不同年龄组的绝经后妇女骨密度的比较 (g/cm², $\bar{x} \pm s$)

Table 3 Comparison of bone mineral density between different age groups in postmenopausal women

年龄组 (岁)	例数 (n)	L ₂	L ₃	L ₄	Neck	Troch	InterTro
45 ~ 54	93	0.865 ± 0.156	0.893 ± 0.156	0.910 ± 0.162	0.678 ± 0.129	0.649 ± 0.110	0.955 ± 0.155
55 ~ 64	122	0.754 ± 0.137**	0.796 ± 0.195**	0.852 ± 0.234*	0.616 ± 0.111**	0.585 ± 0.093**	0.872 ± 0.127**
65 ~ 75	54	0.662 ± 0.100** ^{△△}	0.697 ± 0.113** ^{△△}	0.780 ± 0.144** [△]	0.549 ± 0.088** ^{△△}	0.503 ± 0.095** ^{△△}	0.770 ± 0.127** ^{△△}

注: * P < 0.05, ** P < 0.01, 55 ~ 64 岁组、65 ~ 75 岁组与 45 ~ 54 岁组的两两比较; [△] P < 0.05, ^{△△} P < 0.01 65 ~ 75 岁组与 55 ~ 64 岁组的两两比较。Note: * P < 0.05, ** P < 0.01, 55 ~ 64 years old group and 65 ~ 75 years old group compared with 45 ~ 54 years old group; [△] P < 0.05, ^{△△} P < 0.01 65 ~ 75 years old group compared with 55 ~ 64 years old group.

2.4 不同年龄组按 BMI 分组的绝经后妇女骨密度的比较

由表 4 可知,绝经后妇女 45 ~ 54 岁组和 55 ~ 64 岁组,肥胖组不同部位的骨密度均高于对照组 (P <

0.05 或 $P < 0.01$)。65~75 岁组,肥胖组 L4,股骨颈,大转子 and 粗隆间的骨密度均高于对照组 ($P < 0.05$ 或 $P < 0.01$),其他部位无显著性差异 ($P > 0.05$)。

表 4 不同年龄组按 BMI 分组的绝经后妇女骨密度的比较 (g/cm^2 , $\bar{x} \pm s$)

Table 4 Comparison of bone mineral density between different BMI groups in postmenopausal women

年龄组 (岁)		对照组	肥胖组
age group		control group	obese group
45 ~ 54	L ₂	0.826 ± 0.135	0.934 ± 0.168 **
	L ₃	0.859 ± 0.140	0.952 ± 0.167 **
	L ₄	0.884 ± 0.149	0.957 ± 0.175 *
	Neck	0.624 ± 0.113	0.771 ± 0.100 **
	Troch	0.621 ± 0.112	0.697 ± 0.087 **
	InterTro	0.897 ± 0.139	1.055 ± 0.128 **
	55 ~ 64	L ₂	0.729 ± 0.123
L ₃		0.761 ± 0.134	0.840 ± 0.246 *
L ₄		0.812 ± 0.148	0.903 ± 0.304 *
Neck		0.578 ± 0.083	0.663 ± 0.123 **
Troch		0.568 ± 0.077	0.606 ± 0.107 *
InterTro		0.837 ± 0.111	0.916 ± 0.132 **
65 ~ 75		L ₂	0.639 ± 0.102
	L ₃	0.674 ± 0.118	0.715 ± 0.107
	L ₄	0.724 ± 0.113	0.825 ± 0.152 **
	Neck	0.507 ± 0.089	0.583 ± 0.071 **
	Troch	0.473 ± 0.086	0.527 ± 0.097 *
	InterTro	0.702 ± 0.087	0.824 ± 0.129 **

注: * $P < 0.05$, ** $P < 0.01$, 肥胖组与对照组比较。

Note: * $P < 0.05$, ** $P < 0.01$, obese group compared with control group.

3 讨论

骨质疏松症累及多数老年人,尤其是绝经后的老年妇女,严重的骨质疏松可出现自发性骨折,危及患者的生活质量。影响骨密度的原因很多,其中体重指数的因素越来越受到重视。

本研究结果显示,肥胖组绝经后妇女不同部位的骨密度均高于对照组。绝经后妇女各部位的骨密度随年龄的增长而降低,各年龄组间的骨密度有显著性差异。从而证实年龄和体重指数是影响骨密度的重要因素,绝经后妇女肥胖者骨密度较正常体型者高,这与已往研究的结论一致。国外报道显示^[2-3],超重和肥胖的绝经后妇女腰椎、股骨颈、全髌的骨密度明显高于体重正常的绝经后妇女,体重指数和骨密度呈正相关,年龄和骨密度呈负相关。国内亦有研究显示^[4],体重和体重指数是影响骨密度的一个重要因素,体重和体重指数与绝经老年妇女不同部位的骨密度存在一定的相关性。

体重、体重指数对于骨密度的影响,其机制可能为多因素作用的结果,其中包括机械负荷因素^[5],即体重高的患者承受的负荷大,骨骼负重直接转化为机械应力刺激骨形成,抑制骨吸收,从而有利于提高骨强度和骨矿含量,延缓骨质疏松的发生和降低其程度。绝经后妇女骨质疏松症的发病机制也与卵巢功能减退,雌激素分泌降低密切相关^[6-7]。在正常骨代谢周期,其骨吸收和骨形成维持在一种动态平衡状态。绝经后妇女骨质疏松主要是由于雌激素缺乏,使破骨细胞功能增强,骨丢失加速,而骨丢失与骨重建又有着密切联系。一旦平衡失衡,骨吸收大于骨形成就发生骨质丢失。高体重和高体重指数的保护作用还来源于体内激素的影响,绝经后肥胖妇女身体脂肪组织多,有更多的雌激素转换,体内雌激素水平较高。此外,体重和体重指数也是人体综合营养状况的反映,不良的营养状况直接影响骨重建。有研究表明^[8],瘦素和胰岛素样生长因子-1 (IGF-1) 对绝经后妇女骨量的保留有积极作用。肥胖者常有高胰岛素血症,可使 IGF-1 结合球蛋白产生减少,从而导致 IGF-1 升高,刺激成骨细胞分化,促进骨形成^[9]。现亦发现,体胖者血清瘦素 (Leptin) 浓度较高^[10],瘦素通过多种方式促进骨化而影响骨量^[11]。因此,适当的提高体重和体重指数,是预防骨质疏松的重要措施之一。

绝经后妇女是骨质疏松的高发人群,对绝经后妇女要定期做骨密度检查,早期发现,及时采取适当的预防和治疗措施,有效防止骨质疏松并发症的发生。

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