25-OH vitamin D levels in patients with pituitary adenoma

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ABSTRACT

Pituitary adenomas (HA) are diagnosed by radiological imaging or by evaluating the hormonal activity of the pituitary incidentaloma in order to investigate the signs and symptoms that are thought to be related to the compression of a mass in the pituitary gland. In vitamin D deficiency, the risk of osteoporosis and bone fracture increased. The aim of this study was to evaluate vitamin D levels in pituitary adenomas. The study included eighty-eight (88) patients (60 females and 28 males) who were followed for pituitary adenoma between the years of 2016 to 2018. Patients’ physical examination, pituitary MR results, FSH, LH, estradiol, testosterone, ACTH, cortisol, growth hormone, Igf-1, prolactin and 25-OH vitamin D levels results were recorded. 1 mg dexamethasone test was performed in appropriate patients.

Of the 88 patients with pituitary adenoma, 62 (70.4%) had vitamin D deficiency, while 19 (21.6%) had vitamin D insufficiency. Only 7 patients (8%) had vitamin D levels above 30 ng / dl and were adequate (Table 1 and Figure 1).

The mean age of the patients with non-functional adenoma was 41.7 years (min: 18-max: 68); 7 (33.3%) were males and 13 (61.9%) were females. In 15 patients, vitamin D was < 20, while 6 patients had vitamin D value of ≥20-<30. The

INTRODUCTION

Pituitary adenomas are most common in the 3rd decade and constitute 10% of all intracranial neoplasms (Gsponer et al., 1999; Saeger et al., 2007; Freda, 1999). Pituitary adenomas are classified according to the size and function of the cell in which they originate (Snyder, 2001). Functional pituitary adenomas may be disorders affecting bone metabolism. This condition was described in Cushing’s disease. Vitamin D has an important clinical role due to its relationship with calcium balance and bone metabolism. This degree of vitamin D deficiency may contribute to the development of osteoporosis and the risk of fracture and fall (Forrest and Stuhldreher, 2011).

The aim of this study was to evaluate vitamin D levels in pituitary adenomas.

MATERIALS AND METHODS

The study included 88 patients (60 females and 28 males) who were followed for pituitary adenoma between the years of 2016 to 2018. Patients’ physical examination, pituitary MR results, FSH, LH, estradiol, testosterone, ACTH, cortisol, growth hormone, Igf-1, prolactin and 25-OH vitamin D levels results were recorded. 1 mg dexamethasone test was performed in appropriate patients.

RESULTS

Of the 88 patients with pituitary adenoma, 62 (70.4%) had vitamin D deficiency, while 19 (21.6%) had vitamin D insufficiency. Only 7 patients (8%) had vitamin D levels above 30 ng / dl and were adequate (Table 1 and Figure 1). The mean age of the patients with non-functional adenoma was 41.7 years (min: 18-max: 68); 7 (33.3%) were males and 13 (61.9%) were females. In 15 patients, vitamin D was < 20, while 6 patients had vitamin D value of ≥20-<30. The
Table 1: 25-OH vitamin D levels in patients with pituitary adenoma.

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Gender</th>
<th>25 OH vitamin D levels (ng/ml)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>&lt;20</td>
<td>≥20 &lt;30</td>
</tr>
<tr>
<td>Non-functional</td>
<td>Male</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Adenoma</td>
<td>Female</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Acromegaly</td>
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<td>4</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Cushing</td>
<td>Male</td>
<td>-</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>Total</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Prolactinoma</td>
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<td>6</td>
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<tr>
<td></td>
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<td></td>
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<td>48</td>
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<tr>
<td></td>
<td>Total</td>
<td>62</td>
<td>19</td>
</tr>
</tbody>
</table>

Figure 1: 25-OH vitamin D levels by gender in pituitary adenoma cases.

The mean age of patients with acromegaly was 46.1 years (min: 33-max: 64); 6 (54.5%) were males and 5 (45.5%) females. In 8 patients, vitamin D was <20, while 2 patients had vitamin D value of ≥20-<30. The mean age of the 3 female patients with Cushing disease was 33.3 years (min: 18-max: 48). In 2 patients, vitamin D was <20, while 1 patient had
vitamin D value of ≥20–<30. The mean age of patients with prolactinoma was 32.3 years (min: 19-max: 60); 15 (33.3%) were males and 39 (61.9%) females. In 37 patients, vitamin D was <20, while 11 patients had vitamin D value of ≥20–<30. Only 25 of the 88 patients had 25 OH vitamin D levels above 30 ng / dl. One of them was acromegaly and the other six patients with prolactinoma.

DISCUSSION

Vitamin D is a secosteroid hormone. Serum 25 hydroxy (OH) vitamin D levels are measured and their adequacy evaluated (> 30 ng/ml: adequate, 20 to 30 ng/ml: insufficiency, <20 ng/ml: deficiency, <10 ng/ml: severe deficiency) (Holick, 2007). Vitamin D deficiency is associated with osteoporosis, possibly fractures and rate of falling (Holick, 2007; Tsai et al., 1987). Osteoblasts have prolactin (PRL) receptors.

Prolactin has an adverse effect on bone metabolism by inhibiting osteoblast proliferation and increasing osteoclastic activity. Prolactin also causes an increase in RANKL and osteoprotogerin. As a result, bone loss is increased. In women with prolactinoma, approximately 25% of the vertebrae are lost due to hypogonadism. Treatment with bone density increases, but may not return to the old level. In men with prolactinoma, osteopenia / osteoporosis occurs due to low testosterone levels (Greenspan, 1986; Vartej et al., 2001; Mazziotti et al., 2015, 2011).

The pathogenesis of osteoporosis in patients with Cushing’s disease decreased osteoblast function, calcium absorption from the bowel, calcium excretion from kidneys, gonadal steroid synthesis, muscle mass and strength, and growth hormone secretion. In Cushing’s disease, osteoporosis was found in 50% of the patients. Even in these patients, non-traumatic fractures or osteoporosis incompatible with age was detected (Kaltzas et al., 2002; Mancini et al., 2004; Minetto et al., 2004; Mirza and Canalis, 2015). In acromegalic patients, growth hormone stimulates the carboxylation of osteocalcin, on the one hand and the production of RANKL and osteoprotogerin. Growth hormone and IGF-1 stimulate the 1-alpha hydroxylase enzyme in the kidney to increase the synthesis of 1, 25 dihydroxycholecalciferol. Even if osteoporosis does not increase in acromegalic patients, the risk of bone fracture increased (Giustina et al., 2008; Madeira et al., 2013; Wassenaar et al., 2011; Anthony, 2014).

Vitamin D deficiency and / or insufficiency were found in all patients in this study. In addition to existing pathophysiological conditions we opined that vitamin D deficiency increases the risk of osteoporosis and / or bone fracture in these patients.

Conclusion

Vitamin D deficiency should be considered and treated in these patients with high risk of osteoporosis or high risk of bone fractures when treating these patients.

REFERENCES


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