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## Effects of Parathyroidectomy on Patients' Neuropsychological Condition

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*Dear Editor,*

After diabetes and thyroid disorders, primary hyperparathyroidism (pHPT) is the third most common endocrine disorder [1]. This complication usually occurs as a benign parathyroid adenoma; hyperplasia and parathyroid carcinoma are less observed [1, 2]. pHPT may be due to mutations in the multiple endocrine neoplasia type 1 (MEN1), *CDC73*, and *calcium-sensing receptor* genes [3]. The primary diagnosis of symptomatic pHPT is performed with bone and kidney disorders, mood swings, cognitive impairments, and gastrointestinal symptoms. It will be confirmed with hypercalcemia and an elevated parathyroid hormone (PTH) level. Ultrasounds, computerized tomography scans, magnetic resonance imaging, and sestamibi scanning are used to localize parathyroid tumors. Pathology is essential in hyperplasia and parathyroid carcinoma cases [2, 4].

Resection of parathyroid glands and tumors (parathyroidectomy) is a specific treatment for these patients. Frequent recurrence of tumors after resection may occur, but due to its slow growth, there is a prolonged life expectancy after treatment [5]. Although the disease can be treated and controlled by surgery, it leaves some complications that may change their quality of life, including poor concentration, fatigue, anxiety, mood swings, depression,

and cognitive problems [6]. Furthermore, in some circumstances, such as asymptomatic pHPT, the guidelines conservatively present indications of surgery treatments. Thus, medical treatment is chosen, and surgery is delayed. Surgical criteria are serum calcium level, skeletal and renal state, and age [7]. However, clinicians consider identifying patients with fracture risks, kidney stones, and even cardiovascular disease when deciding to do surgery, but neuropsychological disorders can be crucial. Neuropsychological may also become more severe despite other concerns such as osteoporosis, kidney stones, and renal dysfunction.

Nevertheless, this issue is somewhat neglected because these symptoms are nonspecific, and there are some difficulties in quantifying them. Therefore, investigating the effect of surgery on the neuropsychological situation is recommended to be an approach of clinical trials to help treatment and prevent unwanted complications in both symptomatic and asymptomatic pHPT. Previous studies showed pHPT patients, who underwent curative surgery, have neurocognitive situation changes and/or quality of life [6-8]. However, further clinical research is still needed to complete our knowledge, and a systematic review and meta-analysis can provide a more comprehensive insight into this subject. The former studies also represent the importance of

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this matter. For example, studies have shown that hypercalcemia degree is a major cause of neurocognitive disorders, but hypercalcemia is not only limited to pHPT and has different causes [9]. So, more investigations are necessary to assess neuropsychological causality and severity in pHPT patients.

The association of various genetic factors related to hyperparathyroidism, such as CDC73 gene mutations leading to hyperparathyroidism-jaw tumor syndrome, with neuropsychological disorders is unknown [10].

In conclusion, consideration of the novel methods for quality of life and neuropsychological features assessment, association levels of pHPT and hypercalcemia with mental

health, the effect of comorbidity with other endocrine disorders, neurological diseases, and even secondary hyperparathyroidism, the genetical and environmental factors' role, and post-surgery's therapeutic strategies are suggested for future studies in order to understand the concept better. [GMJ.2022;11:2366]

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### Conflict of Interest

The authors have no conflict of interest to declare.

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