Case Report

Hypocalcaemia as an important differential diagnosis in patients suffering from stridor following thyroidectomy

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Number of Tables: 0

Number of Figures: 0

Word count: 885

Keywords: hypocalcaemia, stridor, laryngospasm, thyroidectomy, hypoparathyroidism

Key Clinical Message

It is essential to consider hypocalcaemia as a cause of stridor. Especially in postoperative stridor after thyroidectomy, hypocalcaemia secondary to hypoparathyroidism is an important differential diagnosis

Abstract

We present the case of an adult patient with acute dyspnoea and stridor following thyroidectomy. After excluding other causes of postoperative stridor, we concluded the patient was suffering from laryngospasm due to hypocalcaemia secondary to postoperative hypoparathyroidism. It is important to consider hypocalcaemia as a differential diagnosis in stridor.

Introduction

A newly developed stridor following total thyroidectomy in adult patients is most commonly caused by swellings, hematoma or paralysis of the vocal cord. Although being a rare cause of stridor, laryngospasm caused by hypocalcaemia due to postoperative hypoparathyroidism should also be considered as a differential diagnosis [1].

We report an adult patient suffering from dyspnoea, laryngospasm and laryngeal stridor after undergoing a total thyroidectomy. Postoperative hypocalcaemia was found to be the cause of the symptoms, which could be completely resolved after calcium replacement therapy.

Case Report/Case Presentation

An adult patient underwent a total thyroidectomy for struma multinodosa at our hospital. During surgery, one parathyroid gland has been re-implanted into the left lateral throat muscle.

On the first post-operative day, the patient complained about general discomfort, paraesthesia, nausea and dizziness at mobilisation. The calcium blood level was 1.73mmol/l and parathyroid hormone was 17.4pg/ml. We initiated a calcium substitution with 1g calcium and 0.5µg Vitamin D per day, under which the paraesthesia reduced.

On the second postoperative day, the patient suddenly suffered from severe paraesthesia at the entire body with dyspnoea and stridor – subjectively describing a laryngospasm.

Investigations:

Besides the laryngeal stridor, a positive Trousseau sign was noted in the clinical examination. The postoperative laboratory results showed a decrease of the calcium blood levels with a hypocalcaemia of 1.68mmol/l. The blood oxygenation level was 94% with 2l of oxygen flow, the blood pressure 160/85mmHg and the pulse 75/min.

A postoperative laryngoscopy had previously shown a good function of both vocal cords. Furthermore, a postoperative hematoma could be excluded using sonography and there was no lingering for an allergic reaction. A hypocalcaemia due to postoperative primary hypoparathyroidism therefore seemed to be the explanation for the patient's laryngospasm and stridor.

Treatment:

Considering hypocalcaemia as the cause of stridor and laryngospasm, an intravenous infusion of 20ml calcium gluconate 10% (which is equivalent to 184mg calcium) was immediately given within four hours, while electrolyte blood levels and the patient were monitored.

Outcome and follow-up:

The intravenous calcium substitution with 20ml calcium gluconate 10% completely reversed all symptoms: the laryngospasm and stridor disappeared, the pulmonary auscultation was normal and the blood oxygenation level reached 99% without oxygen substitution. Additionally the nausea and dizziness, which were present since the first operative day, disappeared after calcium was replaced. A control of calcium blood levels showed an increase of calcium to 1.91mmol/l. With an oral substitution of 1.2g calcium and 0.5µg Vitamin D per day, the patient felt more comfortable and was then discharged the following day without any severe symptoms. In the ambulant sector, the calcium blood levels and parathyroid hormone were frequently controlled by the patient's general practitioner for an optimal individualized calcium substitution, which was continued with a 1g calcium and 1µg Vitamin D per day for more than one year after surgery.

Discussion/Conclusion

Although laryngospasm is a rare condition after thyroidectomy, it is a serious complication of hypocalcaemia and potentially lethal [1, 2]. Therefore, hypocalcaemia should always be considered as a differential diagnosis in adults with acute dyspnoea and stridor. Especially in the context of a primary hypoparathyroidism with insufficient parathyroid hormone secretion after thyroidectomy, we need to consider hypocalcaemia besides other postsurgical complications as a cause of stridor [3]. A prompt treatment with intravenous calcium gluconate alongside monitored magnesium levels is warranted and can resolve all symptoms [1, 4, 5].

In most cases, symptoms of postsurgical hypocalcaemia are present immediately up to 96 hours after surgery [5-7]. Nevertheless, even years after thyroidectomy stridor can be caused by postoperative chronical primary hypoparathyroidism and a consecutive hypocalcaemia [4]. We should therefore always be aware of hypocalcaemia in patients who present stridor at any time-point after thyroidectomy.

An exclusion of other possible causes of stridor including laryngoscopy and sonography is essential in the postoperative setting. Main postoperative complications of thyroidectomy are injury to the parathyroid glands and to the laryngeal nerves, but also tracheal compression secondary to hematoma or tracheomalacia [4, 5, 8, 9]. An injury of the parathyroid glands can lead to the

manifestation of temporary and even permanent hypocalcaemia due to low parathyroid hormone levels [9]. It occurs in up to 15% of postoperative patients, who can be symptomatic or asymptomatic [4, 9, 10]. Especially at risk are patients who already present low levels of parathyroid hormone at surgery and in who the parathyroid glands are resected [9]. Hypocalcaemia causes an increased neuromuscular irritability that can lead to muscular cramps, circumoral numbness and paraesthesia of the feet and hands - or even to medical emergencies such as laryngospasm, myocardial dysfunction, seizures, generalized or focal tonic muscle cramps in severe cases [3, 4, 11]. Laryngeal stridor that processes to laryngospasm can be one of the first signs of hypocalcaemic tetany [5].
In conclusion, we would like to emphasise that it is essential to consider hypocalcaemia as a cause of stridor. Especially in postoperative stridor after thyroidectomy, hypocalcaemia secondary to hypoparathyroidism is an important differential diagnosis [5, 9]. In particular, patients with a re-implantation of a parathyroid gland should be monitored closely.

Statements

Statement of Ethics

The authors affirm that the study was done in accordance with the World Medical Association Declaration of Helsinki. The patient has given written informed consent prior to the study to use the clinical data for research purposes and in particular for this case report.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Funding Sources

The authors received no specific funding for this work.

Author Contributions

C.N. is the corresponding author, who wrote the case report and was involved in the patient's postoperative treatment. T.G. wrote and reviewed the case report and was involved in the patient's treatment as a supervisor of endocrine surgery. J.I. wrote and reviewed the case report as the chief of surgery, who was involved in the patient's treatment. R.G. took part in writing and finalizing the case report and was involved in the patient's surgery and treatment as a supervisor of endocrine surgery.

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