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Case Report

Emergency surgical management strategy for extra dural hematoma with pre-existing undiagnosed hypothyroidism: A case report

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ABSTRACT

Extra dural hematomas (EDH) are usually characterized by a rapidly progressing clinical course within several hours. Surgical management of EDH with hypothyroidism is a challenging issue in emergency hour, as the ultimate outcome depends on the time since trauma, the interval between admittance and operation, associated co-morbidities and the location of hematomas. We received a 55 yr old woman with Rt. Temporoparietal EDH with significant mass effect on examination revealed some of the clinical findings, but not the goiter, of hypothyroidism being confirmed on thyroid function test. Accordingly, we planned for craniotomy with evacuation of extra-dural blood clots ↓ local anesthesia (LA), with immediate post-operative L-Thyroxine supplementation through Ryle's tube. Thus, thorough clinical knowledge on general examination will help sensitize the neurosurgeon to exclude common co-morbidities, e.g. hypothyroidism in our case, while focusing on surgical and anesthetic aspects of relevance of the surgically planned traumatic brain injury cases.

1. Case report

A 55-year-old woman was admitted in the emergency hour with head injury due to RTA (pedestrian hit by a motorcyclist from side) with altered sensorium with CT scan of brain showing Rt. Temporoparietal EDH with significant mass effect (Fig. 2a). On general examination, she was cachectic with GCS – 11/15, Pulse – 54/mins, BP – 140/90 mmHg and pupils – mid dilated sluggishly reacting bilaterally. She had dry, coarse, pale skin (Fig. 1a) and sunken face without thyroid gland enlargement. We suspected and investigated her for hypothyroidism based on these clinical findings. Surprisingly, the report was of T_3 – 0.25 ng/dl, T_4 – 1.59 μg/dl, TSH – 128 μu/ml. Understanding the impact of general anesthesia upon it, immediately we proceeded for Rt. Temporoparietal Free-flap Craniotomy ↓LA with evacuation of ~100 ml EDH blood, with post-operative L-Thyroxine (100 μg/day) through Ryle's tube. Repeat CT on 4th post-operative day revealed completely evacuated Rt. Temporoparietal EDH without mass effect

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Fig. 1 – (a) Preoperative patient photograph with dry, coarse and pale skin. (b) Patient photograph as on post-operative day 7 (discharged with Ryle's tube).

(Fig. 2b). Thyroid function test on 7th post-operative day revealed T_3 – 30.5 ng/dl, T_4 – 2.49 μg/dl, TSH-71.20 μu/ml. She was discharged on 7th post-operative day with GCS-15 with bilateral normal size equally reacting pupils with Ryle's tube in situ (Fig. 1b). She came for follow up at 1month, 3months and 6 months. For last 4 months, she is euthyroid and able to perform her daily activities smoothly.

2. Discussion

The ultimate result of surgical treatment for EDH depends on associated diseases e.g. hypothyroidism in our case. We should plan and decide the proper treatment modality for such a case in emergency hour considering thyroid hormone physiology, impact of surgery on hypothyroidism, type of anesthesia suitable for the situation and peri-operative maintenance of euthyroid status.

Thyroid hormones have pleotropic actions in virtually every organ system, playing a crucial role in cardiac contractility, vascular tone, water and electrolyte balance, and normal function of the central nervous system. A euthyroid state is always necessary to obtain the best possible results from any kind of surgical intervention.[1]

Not only does hypothyroidism have a significant effect on different surgical parameters, but the reverse is also true. The stress of surgery has a direct effect on the thyroid axis with alteration in concentrations of TSH and T3. Patients undergoing surgery will manifest the classic euthyroid sick syndrome (ESS).[2,3] Serum reverse T3 (rT3) remains unchanged early in surgery, but then its levels usually increase and stay elevated until the fourth or fifth post-operative day. Surgery induces an increase in serum cortisol, which may precede the changes seen in the thyroid axis, suggesting a possible causal relationship. This relationship, however, may be oversimplified because the same changes in the thyroid axis were noted in other studies in which the rise of cortisol with surgery was abolished. At the time elderly patients undergoing emergent surgery were evaluated, similar changes were noted.[4]

Considering general anesthesia, total T3 is decreased 30 min after induction and remains low for at least 24 h postoperatively. Free T3 is also decreased slightly, after an initial increase in the absolute percentage of free hormone on the day of the surgery. Free T4 seems to respond similarly to free T3. Serum total T4 will vary depending on type of anesthesia, with an increase associated with general anesthesia, whereas a slight decrease in T4 is seen with epidural anesthesia. Serum TSH concentrations remain unchanged with the exception of an increase seen at the time hypothermia is induced.[4]

Classic signs of hypothyroidism, such as the dry skin, a slowed deep tendon reflex relaxation phase, bradycardia, hypothermia or the presence of a goiter must be sought. We must suspect hypothyroidism if some of these are present on

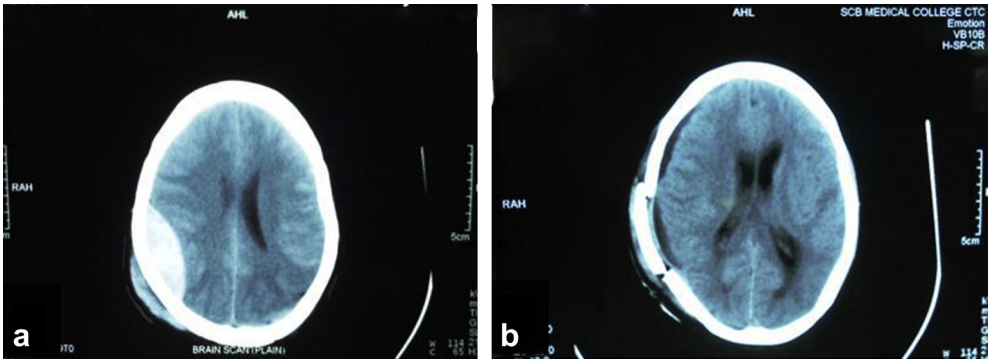

Fig. 2 – (a) Preoperative plain CT scan of brain showing Rt. Temporoparietal EDH with significant mass effect. (b) Postoperative plain CT scan of brain showing completely evacuated Rt. Temporoparietal EDH with bone flap in situ without mass effect.

examination and investigate for thyroid function test without delay.

Low serum free T4 and significantly elevated TSH are not consistent with ESS and are suggestive of hypothyroidism. If such a picture is present, replacement with T4 is indicated to render the patient euthyroid[5]. We administered L-Thyroxine (100 μg/day) through Ryle's tube and the hormonal status on 7th post-operative day showed some improvement of her hypothyroid status.

3. Conclusion

It is stressed that small size <10 ml, GCS >12 and locations other than temporal area are the criteria for conservative management. Emergency surgical management needed if signs of neurodeterioration, increase in size of hematoma on CT, bradycardia, hemiparesis, pupillary abnormalities, delay in referral. A strict vigilance is always to be kept for general examination findings related to common endocrine diseases, not necessarily the classical presentation always, and patients should be subjected to relevant laboratory tests to establish the associated co-morbid state to ease out further plan and management from anesthetic as well as surgical aspects. Early diagnosis and immediate surgical intervention of EDH had good outcome, even with associated disease provided the complete clinical assessment and timely management were proper and individualized.

Conflicts of interest

All authors have none to declare.

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