

CASE PRESENTATION

Carcinoma of the Thyroid Gland with Unexpected Rare Complications

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ABSTRACT

According to the Kuwait Cancer Registry (1971-1982), thyroid cancer is the second most common cancer in females and the sixth in males. In this condition surgery is the main line of treatment which is usually followed by a good recovery and the least complications. In this report we are presenting the severe metabolic changes which developed in one of our cases who needed postoperative irradiation. The various factors contributing to the condition and their management are also discussed.

CASE REPORT

K.A., a 62 year old female patient presented with a gradually enlarging left neck mass of 3 years duration. An open biopsy was performed in Oman and reported to be metastatic carcinoma in the lymph nodes. On 19th April 1982 the patient was referred to Kuwait Radiotherapy Department for further management. She appeared healthy and had no other complaint apart from the neck mass. It was hard, lobulated, had indefinite margins, situated mainly at

the left posterior triangle and adherent to the sternomastoid muscle and the surrounding tissues. There was a two inch long scar of previous biopsy at the lower part of the mass. Examination of the rest of the neck revealed no palpable thyroid gland and no enlarged lymph nodes or other masses. The patient denied any change in her voice and checking of the other systems showed no abnormality. Indirect laryngoscopy revealed mobile cords and no pathology. The slides of previous biopsy were reviewed at the Pathology Department — Al Sabah Hospital and reported to be metastatic lymph nodes from a Papillary carcinoma of the Thyroid Gland. A complete series of tests were then carried out. Her haemogram, SMAC and chest X-ray were normal. Neck X-ray showed calcified round shadow behind the suprasternal notch. The gland was found to be euthyroid, and there was diminished uptake near the isthmus as shown by scanning. Ultrasound examination to the neck and liver showed normal liver and the calcified round shadow was found to be cystic and thought to be connected to the thyroid gland. At operation on 8th May 1982, the cystic calcified mass was first dissected and then removed. It was found to be situated in the upper mediastinum, receiving its blood supply from the thymus gland and had no connection to the thyroid. Tedious and difficult dissection was encountered in the left posterior triangle. The involved lymph nodes were found to be inseparable from the sternomastoid muscle, vagus nerve and internal jugular vein. Therefore, these structures were sacrificed for complete removal of the mass. Lastly the thyroid gland was dissected and removed totally (Figure). The primary tumour was found to be one

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The Figure shows the completely removed thyroid gland at top left with the metastatic mass on the right and the cystic calcified mass below.

centimeter in diameter, situated at the upper pole of the left lobe. Three parathyroid glands were identified as well as the recurrent laryngeal nerves. No other lymph nodes were encountered in the rest of the neck. Due to the sacrifice of the left vagus nerve, left vocal cord paralysis was expected. However, recovery was uneventful and on 17th May 1982 the patient was transferred to the radiotherapy department for consideration of external irradiation to the neck. There she had a thyroid scan, given I^{131} 55 mci on 27th May 1982 and irradiation started on 5th June 1982. Nine days later she developed an increasing stridor for which she was given antibiotics and bronchodilators with some relief. Two weeks later dyspnoea and respiratory distress developed. Indirect laryngoscopy revealed paralysis of the left vocal cord, mobile right cord and congested oedematous laryngeal lumen, consistent with post-radiation changes. A neck X-ray showed side to side narrowing at the upper part of the trachea. Irradiation was then discontinued, the patient was given I.V. steroids, diuretics, antibiotics and a tracheostomy was performed. By that time the patients condition had

already deteriorated to a great extent. It was decided on 29th July 1982 to transfer her to the surgical I.C.U. for further management. The patient was confused, drowsy, unable to move both legs and had infection of tracheostomy and fungal infection at the groins, perineum and submammary regions. She was chesty, dehydrated, oliguric and had 37.5°C temp., 106/min pulse, B.P. 90/60 and respiratory rate 24/min. Her haemogram was as follows: WBCs 3000/cmm, RBCs 3.52 mill/cmm, Hb 10.8 gm/100 ml and haematocrit 31.6. The SMAC was reported as follows : Glucose 232 mg/100 ml, urea 19 mg/100 ml, creatinine 1.1 mg/100 ml, sodium very low-unrecordable, potassium 2.1 meq/L, chloride 54 meq/L, bicarbonate 38 meq/L, calcium 7.7 mg/100 ml, phosphorus 1.2 mg/100 ml, total protein 5.8g/100 ml, albumin 3.1. gm/100 ml, total bilirubin 0.8 mg/100 ml, alkaline phosphatase 78 IU/L, LDH 590 IU/L, SGOT 42 IU/L. and SGPT 52 IU/L. The blood gases were as follows: PH 7.7, PaCo₂ 63 mm Hg, PaO₂ 53 mm Hg, and standard bicarbonate 36.3 meq/L. Intensive treatment and monitoring was then started immediately. This consisted of correcting the

water electrolytes-acid-base imbalances, management of the infections, eltroxine intake and physiotherapy. By the third day great improvement in the general condition was achieved. Thereafter her blood picture and blood biochemistry were stable and all infections were clearing. The legs remained very weak for which intensive physiotherapy was continued. After about one month from application, the tracheostomy was removed, spontaneous breathing was satisfactory and on 15th Aug. 1982 she was transferred to the general ward. By that time her leg movements were much better, a few days later she developed at the left calf clinical features consistent with D.V.T. she was therefore heparinised and the condition improved during the next few days. When the patient was discharged from the hospital on 6th Sept. 1982, she was walking normally without help, had normal haemogram and blood biochemistry and was receiving eltroxin and warfarin. The patient was then allowed to return home and when seen about six months and one year later, she was continuing to do well, was asymptomatic and scanning of the neck and upper mediastinum revealed no uptake. From her first consultation until discharge the patient spent over five months in the hospital. We hear every now and then from her relatives who say that she is still continuing to do well.

DISCUSSION

In papillary and follicular thyroid carcinoma, it was suggested that if the surgeon is convinced that the primary tumour has been completely removed, there is no place for prophylactic irradiation. Particularly in those under the age of 45, it is potentially dangerous and is contraindicated¹⁴. There is a place for irradiation alone or combined with radio-iodine if complete excision of an extrathyroidal tumour has been impossible, or in patients over the age of 45 if there is the slightest doubt that excision has been incomplete^{13 14}. In our case although we carried out an extensive removal of all pathological tissues we felt that irradiation combined with radio-iodine was still indicated due to the extrathyroidal tumour spread and the age of the patient.

Although radiation sickness and skin changes might occur in some patients, in Kuwait this was probably one of the few patients who had postoperative irradiation following thyroidectomy in whom adverse effects with such severity had developed.

Perhaps more important are the severe metabolic changes which occurred in this patient, probably due to the unsatisfactory follow up and the adverse effects

of radiation. These could be summarised by Hyponatraemia, Hypochloraemia, Hypokalaemia, Hypophosphataemia, and severe metabolic alkalosis and respiratory acidosis.

The causes of hyponatraemia are many. The patient's intake of sodium was not adequate. She had diarrhoea, vomiting, received diuretics and her fluid intake was less than the normal requirement. Hypokalaemia, hypochloraemia and hypophosphataemia might develop for the same reasons. As blood homeostasis takes precedence over sodium homeostasis, hypotension and other manifestations of volume contraction were not as severe as hyponatraemia⁵. The effects of hyponatraemia particularly if it is acute, are mainly on cerebral function. Water intoxication, or disequilibrium syndrome might develop³. In our patient, the hyponatraemia occurred over a few days and was mainly due to volume depletion. Hyponatraemia of that degree may cause cerebral depression of various degrees from disorientation to coma¹. Depending on the acuteness and degree of sodium level, neuromuscular, renal and cardiovascular changes may occur. However one must admit that it may be difficult to ascribe any precise clinical manifestations of the low sodium level.

The acid-base disturbances were mixed. There were severe metabolic alkalosis and respiratory acidosis. The respiratory acidosis is a primary disturbance because the Pa CO₂ exceeds the limits of compensation⁸. Respiratory acidosis might be explained by electrolyte disturbances of hypokalaemia, hyponatraemia and hypophosphataemia, which also affected the neuromuscular function². On the other hand volume contraction, hypochloraemia and hypokalaemia were possible causes to the metabolic alkalosis¹⁰.

After defining the problems and estimating their magnitude, therapeutic strategies were put towards the patient response. Frequent biochemical measurements were the guidelines for instituting or modifying therapy.

The patient was ventilated with volume cycled ventilator until her gas exchange function was satisfactory. The magnitude of hyponatraemia was estimated according to the equation $\text{Na Deficit} = 0.6 \times \text{Body Weight} \times \text{Normal Na} - \text{Current Na}$ ⁷. As there was volume contraction and no severe manifestations of hyponatraemia because the condition had developed gradually over few days, it was decided that it would

be better to gradually correct hyponatraemia and volume contraction by infusion of normal saline rather than using hypertonic NaCl solution^{4 6 15}. Management of the acid-base disturbances followed the same lines. Volume expansion with saline and correction of hypokalaemia were accomplished by gradually normalising Pa Co₂ in order not to have major PH drifts if one disturbance is corrected faster than the other^{8 10}. The patient also received sodium acid phosphate 45 meq daily for a few days.

As it was mentioned earlier, after a few days of intensive therapy which resulted in significant correction of the problems, the patient was weaned from the ventilator according to the usual criteria^{2 12}.

This demonstration is further proof that the successful saving of patients lives can be achieved by intensive combined team work.

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