CASE REPORT

Malignant thymoma as etiology of bilateral, biventricular cardiac failure

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Abstract: The authors report on a case of a 60-year-old female admitted to hospital with symptoms of bilateral cardiac failure. Upon ultrasonic examination of the heart, a massive pericardial exudate was diagnosed. Pericardial drainage was done to find the cause of pericardial effusion. Cells of malignant lymphoma were detected cytologically while immunophenotypization demonstrated a malignant lymphoma exudate. A computed tomography (CT) examination of the thorax disclosed a mediastinal tumour with infiltration of both lungs, vascular structures and dissemination on the chest wall. A CT-guided tumour biopsy was performed to confirm or exclude a lymphoproliferative process. Histopathologically, an invasive cortical thymoma was verified. The tumour was evaluated as stage III thymoma according to Masaoka. This case report highlights a rare malignant thymoma, its clinical symptoms, diagnosis, therapy and prognosis (Fig. 2, Ref. 10). Full Text in free PDF www.bmj.sk.

Key words: malignant thymoma, chemotherapy, radiation therapy, tumours, mediastinum.

The lymphoepithelial tissue in the human body is divided into primary (central) tissue and secondary (peripheral) tissues. The primary lymphoepithelial tissue includes the thymus and bone marrow while the secondary lymphoepithelial tissue is found in lymph nodes and spleen. The thymus is a lymphoepithelial organ with typical Hassal’s bodies placed retrosternally in the anterior mediastinum. It is composed of two substances, namely substance corticalis and substance medullaris. The base of the cortex and medulla is a net (reticulum), which is filled with lymphocytes. The main function of the thymus is to produce thymus-dependent lymphocytes which colonize the lymphatic nodes and spleen (1–8). These lymphocytes “re-educate” other lymphocytes to own the immune response; it is a late type of immune tolerance. After fulfilling its basal function, the thymus involutes. This physiological involution is age-related. It takes place at the age of about 12–14 years, i.e. when the function of thymus is fully substituted by peripheral lymphoepithelial tissues. The physiological involution does not have to appear in all cases and it may be incomplete. This condition is referred to as persistence of thymus or subinvolution of thymus. The developmental disorders of thymus, especially the thymic cysts, regressive (dystrophic) changes, inflammations, hyperplasia and tumours (1–8) can etiologically participate in the persistence (subinvolution) of thymus.

Case report

A 60-year-old female with symptoms of bilateral cardiac failure was admitted to hospital. Upon X-ray examination of the thorax, cardiomegaly and an enlarged mediastinum were diagnosed. The ultrasonic examination of the heart revealed a massive pericardial exudate. An electrocardiogram (ECG) (Fig. 1) showed a high heart rate (116 beats/min) and low limb-lead voltage but no ischemic ECG changes. Pericardial drainage was done to find the cause of pericardial effusion. The cytologic examination revealed cells of malignant lymphoma while immunophenotypization demonstrated the malignant lymphoma exudate. After the pericardial drainage, pericardial effusion progressed and new clinical symptoms appeared, namely the vena cava superior syndrome. The computed tomography (CT) examination of the thorax showed a mediastinal tumour with infiltration of both lungs, vascular structures and dissemination on the chest wall. A CT-guided tumour biopsy was performed to confirm or exclude the lymphoproliferative process. An invasive cortical thymoma was verified by histopathology (Fig. 2). The tumour was evaluated as stage III thymoma according to Masaoka. The finding was assessed as primarily inoperable while primary radiotherapy did not seem optimal owing to the extent and inoperability of the thymoma. As a result, a systemic chemotherapy was recommended, based on a combination of cisplatin in an intravenous dose of 100 mg/m² (day 1), doxorubicin in an intravenous dose of 60 mg/m² (day 1) and cyclophosphamide in an intravenous dose of 600 mg/m² (day 4). The patient received four cycles with three-week intervals. Upon therapy, the tumour underwent consequential restaging while the control CT examination of thorax with a bolus of contrast medium proved a significant regression of thymoma. Consecutively, the patient was provided with other
two cycles of chemotherapy. The control CT of thorax with a bolus of contrast medium demonstrated a subsequent significant regression of thymoma. The patient was followed up after six cycles of chemotherapy.

Discussion

Tumours of the thymus can be classified from different points of view, namely as to their biologic character (benign or malignant), etiopathogenetic origin (primary or secondary), and from the aspect of pathologic anatomy (1–8). The most frequent tumour of thymus is a thymoma which can be classified as cortical, medular or mixed from the morphologic point of view (8). In the light of maturity it can be a benign thymoma fully differentiated from the reticular epithelium of thymus, lymphoid thymoma (lymphocytes are components of the tumour) and malignant thymoma (lowly differentiated) infiltrating the mediastinal organs, especially those of the anterior mediastinum. The extent of thymoma can be divided into four stages according to Masaoka (9). The widely used Masaoka Staging System is based on the anatomic extent of disease at the time of surgery, namely on whether the tumour is completely encapsulated (I), whether there is macroscopic invasion into surrounding fatty tissue (II-1), microscopic invasion into the capsule (II-2), or macroscopic invasion into adjacent organs (III), pleural or pericardial implants (IVA), lymphogenous or hematogenous metastases (IVB) (9). The grading refers to microscopic appearance of cancer cells. The thymus gland has a medulla and cortex containing different types of cells. The medulla has more spindle cells (named after their shape) while the cortex has more epithelial cells (the latter cells line the organs and body cavities). The doctors examine the tumour under the microscope and depending on the identified types of cells they classify the thymoma as “medullary” or “cortical”. Sometimes, if there are both spindle and epithelial cells, the tumour is classified as “mixed”. The World Health Organisation (WHO) classifies thymus gland tumours according to the grade and type, namely as A Medullary thymoma, AB Mixed thymoma, B1 Mainly cortical thymoma, B2 Cortical thymoma,
B3 Thymic carcinoma, C Thymic carcinoma – high grade (malignant). Types A and AB are considered non-cancerous (benign). Types B1 to B3 are classified as low-grade (slow-growing) on the borderline between benign and malignant; type C is definitely cancer (10).

Thymoma can occur at all ages, while higher percentage is noted in children and a more frequent incidence is in patients with Cushing’s disease, Addison’s disease, amyloidosis, puerperal praecox, diabetes mellitus, scleroderma, autoimmune thyroiditis, colitis ulcerosa, chronic hepatitis, dermatomyositis and polymyositis and in obese patients (2–8). Thymoma can guide the incidence of myasthenia gravis (more than 50 % of patients with thymoma in strength of occurrence of reactive lymphatic centres in the thymus as a manifestation of the immune response to myoid cells of thymus as well as to skeletal muscle, which means a production of autoantibodies on postsynaptic nicotine receptors, so-called anti-AchRs) (5–8), hypogammaglobulinemia (Good’s syndrome) (ca. 10% patients with thymoma) and red blood line aplasia (10–50% patients with thymoma) (6, 8).

Clinical symptoms of thymoma include particularly the symptoms of mechanical activity of organs in the mediastinum, these are cough, dyspnoe, recurrent respiratory infections, dysphagia or odynophagia, chest pain, syndrome of vena cava superior, Horner’s syndrome, or systemic symptoms such as myasthenia gravis, arterial hypertension, hypercalcemia, and others (1, 2, 7, 8).

The basal diagnosis of thymoma is based on imaging examinations (CT of the thorax or magnetic resonance, mediastinoscopy, videothoracotomy), biopsy, histopathological examination, and oncomarkers (serum beta-choriogonadotropin, alfa-fetoprotein) (2, 3, 8).

Therapeutic intervention due to thymoma includes mainly radical surgery in combination with radiotherapy and chemotherapy since thymoma is extensively radiosensitive and chemosensitive (2, 8). Non-invasive malignant thymomas are usually solved only with radical surgery. Well-encapsulated thymomas do not require postoperative radiotherapy. The therapy of invasive malignant thymoma is precarious and includes primarily a radical or partial surgery with postoperative radiotherapy and chemotherapy (8). In the therapy of inoperable tumours, especially of those staged III and IV, the combination of radiotherapy (total dose of approximately 60 Gy in 30 fractions) and chemotherapy (one of the mentioned regimes) is used (8). Chemotherapy (cyclophosphamide, doxorubicine and cisplatidiam) is usually administered in initial four cycles (cycles are administered at an interval of three weeks) with subsequent restaging (evaluation of the therapeutic effect of used therapy) (8).

The prognosis of thymoma depends on its extent while five-year survival rate is 90% for non-invasive thymoma, 50% for invasive thymoma and 11% for thymoma in stage IV (7, 8).

Conclusion

In the case report, we described a 60-year-old female with symptoms of bilateral heart failure arising from a tumour in the mediastinum with infiltration of both lungs, vascular structures and dissemination on the chest wall.

References


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