CASE REPORT

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Superior vena cava syndrome and pulmonary adenocarcinoma

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Abstract

We report a large-cell adenocarcinoma of the lung in a tobacco smoker with classical superior vena cava syndrome and digital clubbing. Computed tomography and nuclear magnetic resonance revealed the involvement of the vena cava and metastases in the left adrenal gland and central nervous system. Biopsy samples of the mass yielded the diagnosis. The patient underwent a schedule of palliative chemotherapy and brain radiotherapy.

Keywords: digital clubbing, pulmonary adenocarcinoma, superior vena cava syndrome.

Introduction

Superior vena cava syndrome (SVCS) is a clinical condition characterized by phenomena resulting from venous stasis due to thrombosis or extrinsic compression in the brachiocephalic area; and the commonest causes are malignant, mainly lung tumors [1–5]. Clinical features include progressive dyspnea, orthopnea, cough, cervico-facial edema and cyanosis, which added to the imaging data confirm the diagnosis of SVCS [1–5]. The routine management of this syndrome is mainly based on full anticoagulation, and maybe indicated surgery or procedures involving endovascular placement of grafts [1–5].

Herein is described a case of SVCS due to compression by lung cancer and thrombosis. The Brazilian male patient also presented with the characteristics of digital clubbing, a change that can be familial or occur in association with benign or malignant disorders [6, 7].

The objective of this case report is to highlight the relationship between pulmonary adenocarcinoma and SVCS, as well as digital clubbing, in a heavy tobacco smoker.

Case presentation

A 69-year-old Brazilian man with the recent appearance of facial and periorbital edema followed by supraclavicular and bilateral upper limb swelling, in addition to dyspnea was admitted. Approximately 30 days before, he had noticed the development of collateral venous circulation in the upper anterior and posterior regions of the thorax, associated with bilateral jugular distension. He was a non-alcoholic hypertensive and heavy tobacco smoker, without previous thrombophilia nor drug-associated thrombosis. On physical examination, there was moderate edema and venous collateral circulation predominant in the anterior thoracic region, and marked distention of the left jugular vein; additionally, there were features of digital clubbing (Figure 1). Worthy of note, the profile angle was near 180º, with a phalangeal depth ratio over 1. He was not quite certain when the nail changes first appeared, but they preceded the collateral venous distention.

The routine of the laboratory had normal values: leukocyte and platelet counts, urea and creatinine, β_2-microglobulins, uric acid, aspartate and alanine trans-aminases, alkaline phosphatase, serum electrolytes, tests for syphilis, human immunodeficiency virus (HIV) 1 and HIV 2, human T-cell lymphotropic virus (HTLV)-1 and HTLV-2. Abnormal results were: anemia, C-reactive protein (CRP) (6.4 mg/dL), erythrocyte sedimentation rate (ESR) (71 mm/1st hour), and γ-glutamyl transpeptidase (GGT) (48 IU/L). Computed tomography (CT) showed a mass (68×52 mm) in the right side of the anterior mediastinum, with soft tissue density, lobulated contours, which involved and obstructed the SVC (Figure 2). The needle biopsy revealed indicative data of malignancy (Figure 1D), and the immunohistochemistry (IHC) cytoplasmic positivity for pan-cytokeratins (CKs) confirmed the epithelial nature. The expression of CKs (CK7 positive and CK20 negative) established the diagnosis of a lung large-cell adeno-carcinoma.

Therefore, he initially underwent anticoagulation with Enoxaparin sodium and chemotherapy schedule with Cyclophosphamide and Methylprednisolone, with minimal improvement of facial and neck edema. Further Cisplatin and five sessions of chest radiotherapy were employed, and the swelling regressed. His oncological management has included palliative chemotherapy and holocranial radiotherapy due to the cerebral metastases revealed by images of positron emission tomography (PET)-CT and nuclear magnetic resonance (NMR) imaging.

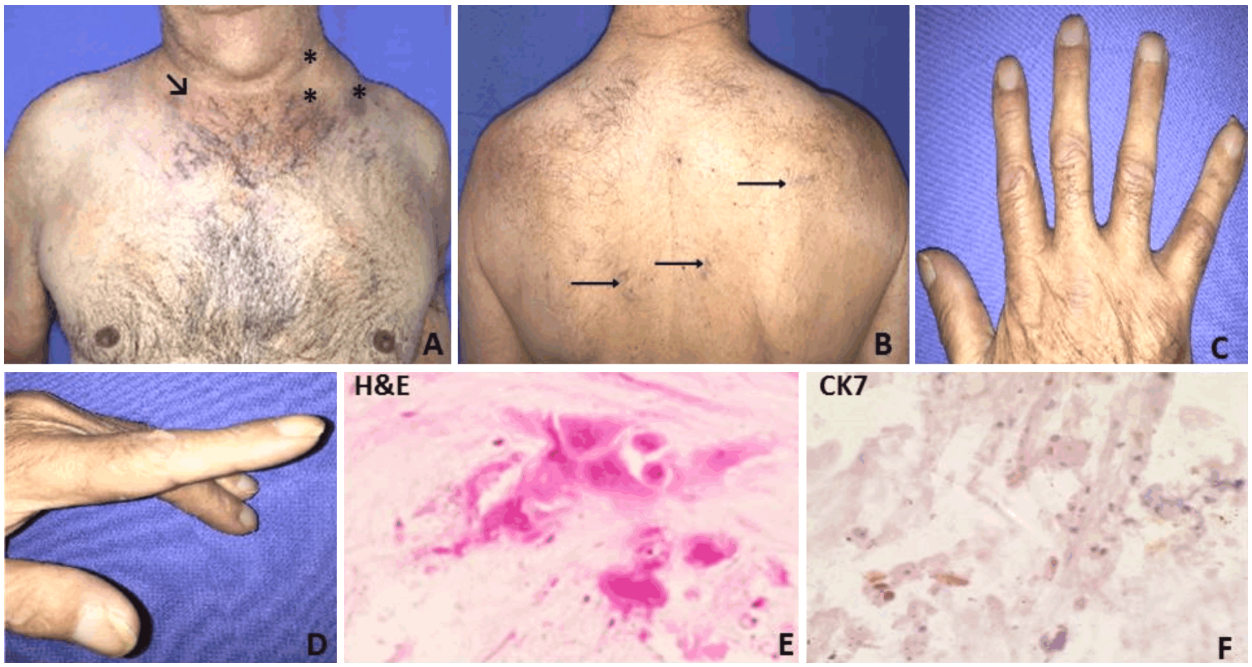

Figure 1 – ***(A and B) Moderate edema and collateral venous circulation predominantly in the anterior thoracic region (arrows), and distention of the left jugular vein (asterisks); (C and D) Images of deformities consistent with bilateral clubbing of the hand fingers; (E and F) Photomicrography of needle biopsy specimen consistent with pulmonary malignancy by HE staining (E, ×400), and the expression of CK7 in immunohistochemistry study (F, ×200). HE: Hematoxylin–Eosin; CK7: Cytokeratin 7.***

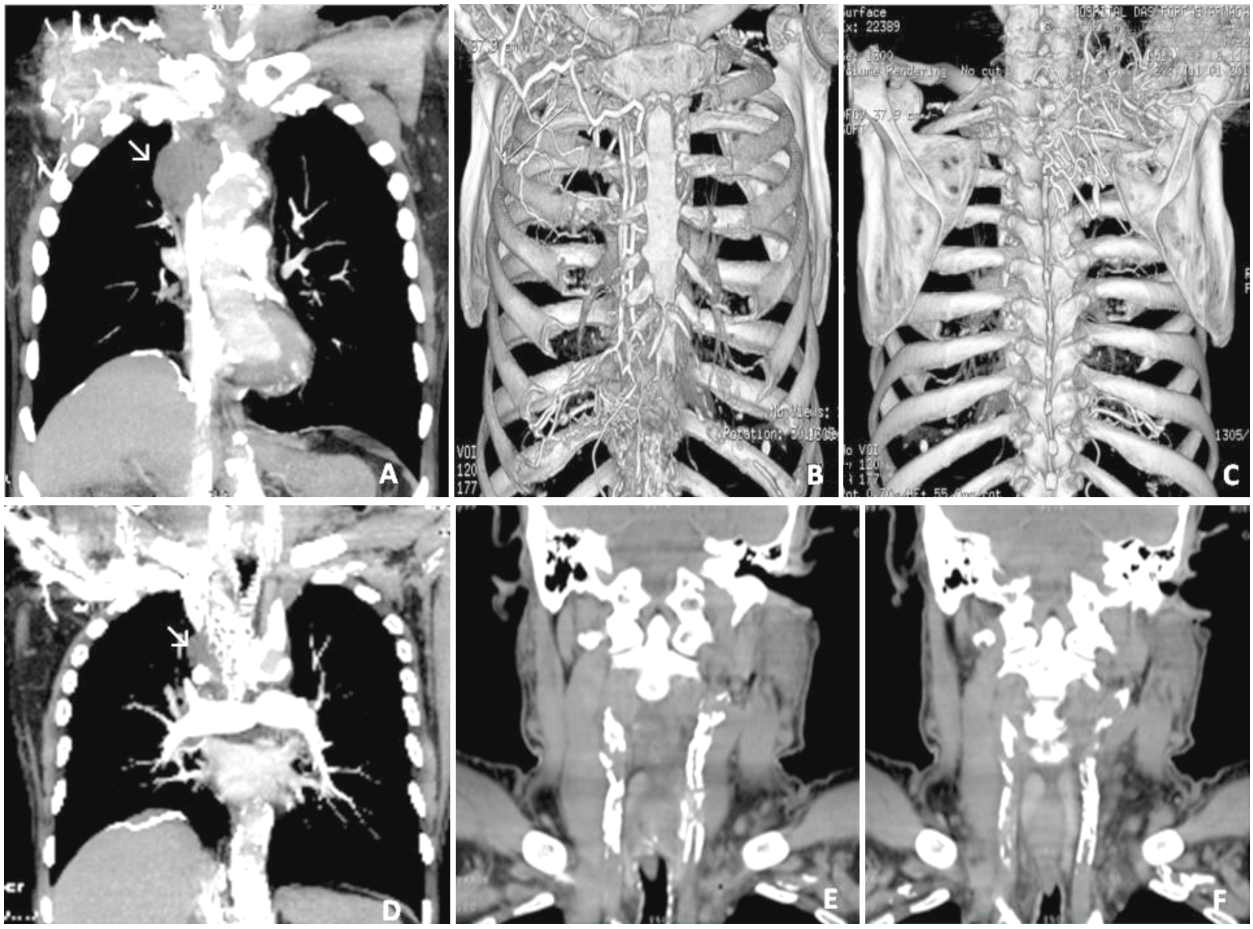

Figure 2 – ***(A) CT images of the oval lobulated mass in the right anterior mediastinum with a density of soft tissue and absence of calcification, involving and occluding the superior vena cava; (B and C) Multiple intercostal collateral veins in the anterior and posterior chest wall; (D and F) Thrombosis of the right internal jugular vein cranially extending to the cervical region. CT: Computed tomography.***

Discussions

In 1757, the features of SVCS were first reported in a patient with an aortic aneurysm [1, 4, 5], and the typical signs and symptoms are facial, neck and upper arm edema dilated collateral thoracic veins, cough, breathlessness, dysphonia, and dysphagia [1–5]. Other manifestations are related to brain edema including nausea, headache, syncope, head fullness, lightheadedness, dizziness, vision disturbances, and mental alterations [1, 4]. Lung cancer, lymphoma, and mediastinal metastases cause up to 90% of cases [1, 5]. Other causes are thymoma, germ cell tumor, aortic aneurysm, tuberculosis, cancers of thyroid, breast or esophagus, invasive procedure in central veins, and paraneoplastic events [3–5]. Venous thromboembolism affects up to 100 cases/1000 person-years in lung cancer; nevertheless, in this setting, a paraneoplastic phenomenon has been scarcely described [3]. It was not discarded in the present case study the hypothesis of the paraneoplastic mechanism. However, different from the report of Santra *et al.* [3], intraluminal thrombus occurred concurrently with local compression and invasion of the SVC by the pulmonary tumor. Interestingly, Sabzi & Faraji reported a radio-induced SVC myxoma in a 27-year-old man with mediastinal and brain implants of seminoma. The intravenous tumor also involved the right innominate and emerged in the right atrium [8]. The mass sometimes is mistaken by a paraneoplastic thrombus [3]. Although without collateral chest venous dilation, he had progressive dyspnea and syncope for a month [8], as in SVCS [1, 4].

The patient herein described had facial and neck puffing, dyspnea, and collateral venous circulation in the upper thirds of the thorax, associated with jugular distension. At first, these changes evolved gradually due to SVC compression by the enlarging mass and regional lymph node implants. The fast worsening was related to thrombosis [3]. He had a right-sided lung adenocarcinoma, as more often occurs in SVCS, because of the vein position at the right side of the mediastinal midline, where it is easily compressed by tumor masses or paratracheal or pericarinal enlarged lymph nodes [3].

Accordingly, with the pertinent literature, the imaging evaluation of the neck and thorax contributed to establishing the definitive diagnosis of SVCS and thrombosis of the jugular vein; and the absence of abdominal vein dilation ruled out a post- or infra-azygous obstruction [1, 3]. Histopathology and IHC studies showed an adenocarcinoma as the origin of compression and possible paraneoplastic phenomenon causing the syndrome [3]. Therefore, the first option for management of the syndrome was full anticoagulation and chemotherapy with Cyclophosphamide and Methylprednisolone, followed by Cisplatin and chest radiotherapy, which resulted in the improvement of the edema and venous distention. Currently, the patient remains under follow-up at the Outpatient Oncology Service.

Easily detected signs on the physical inspection are often useful tools for diagnostic relationships between internal disorders, as SVCS or digital clubbing and malignancy [1–7]. The patient's profile angle and the phalangeal depth ratio were consistent with digital clubbing, which main causes include: (*i*) malignancies – primary and metastatic lung cancers, mesothelioma, and lymphoma; (*ii*) chronic infections and inflammatory entities – bronchiectasis, lung abscess, empyema, tuberculosis, asbestosis, sarcoidosis, HIV, endocarditis, and Crohn's disease; (*iii*) cyanotic congenital heart disease; and (*iv*) familial [6, 7]. Although absent in this case, painful clubbing has to be associated with lung carcinoma and physiopathological phenomena include local hypoxia, platelet activation, the action of signal proteins like vascular endothelial growth factor (VEGF), and angiogenesis stimulation by diverse other mechanisms [7].

The present case report aims to emphasize the relationships of SVCS and digital clubbing with pulmonary adenocarcinoma, which developed in a heavy tobacco smoker. Despite campaigns to prevent smoking, reduce tobacco consumption, and promote abstinence, the prevalence of tobacco use persists as a health burden.

Conclusions

The evidence of bilateral clubbing should call the attention of primary care workers about benign and malignant associated conditions, as the case of lung cancer. An accurate physical examination can also contribute to detect initial features of SVCS; the earliest the diagnosis establishment of the syndrome, the better the patient's outcome.

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Conflict of interests

The authors had full freedom of manuscript preparation and there is no potential conflict of interests.

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