Infiltrative Mediastino-Hilopulmonary Tumor Causing Cardiac Tamponade and SVC Syndrome: A Dramatic Presentation.

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Infiltrative Mediastino-HilopulmonaryTumorCausingCardiacTamponade and SVC Syndrome: A DramaticPresentation.

I. Abstract

Mediastinaltumors pose significant diagnostic and therapeutic challenges due to theirheterogeneous nature and ofteninsidious progression. We report the case of a 52-year-old male professionalvarnisherwithchronicexposure to isocyanates and a history of heavy smoking, whorapidlydeveloped acute cardiactamponade and superior vena cava (SVC) syndrome secondary to an extensively infiltrative mediastino-hilopulmonarytumor. Clinicalpresentationincludedsevererespiratorydistress, hemodynamicinstability, and a tumor syndrome characterized by bilateral cervical masses and an epigastric mass suggestive of metastatic spread. Imaging revealed a large mediastinal mass invading vital thoracic structures, accompanied by massive pericardial effusion and vascularthrombosis. Echocardiographyconfirmedtamponadephysiologywithhallmarkfeatures consistent withcurrent guidelines. Critical hemodynamicinstabilityprecluded invasive histologicaldiagnosis, and despite intensive supportivemeasures, the patient diedshortlyafter admission.

This case highlights the diagnostic delays and therapeutic limitations in managingadvancedmediastinalmalignanciescomplicated by life-threateningcardiopulmonarysequelae. It alsounderscores the importance of earlydetection, particularly in occupationallyexposed populations, and the need for a multidisciplinaryapproach to optimizeoutcomes in high-riskpresentations.

II. Introduction

Mediastinaltumorsrepresent a diagnostic challenge due to their diverse causes and ofteninsidious progression (1). Theymayremainasymptomaticuntilinvade vital structures such as the heart, large vessels, or the pericardium, leading to cardiactamponade or superior vena cava obstruction (2). These compressive syndromes constitutemedical emergencies with high mortality if not recognizedpromptly(3). The riskincreased in individualschronicexposed to toxicsolvents and tobacco, which are involved in the development of respiratory and neoplasticdiseases(4).

We report a dramatic case of an infiltratingmediastino-hilopulmonarytumor, discovered at the stage of acute cardiactamponade and superior vena cava syndrome, illustrating the devastatingconsequences of delayeddiagnosis and highlighting the importance of early screening in at-risk populations.

III. Case Presentation

A 52-year-old man, a professionalvarnisherchronicallyexposed to isocyanates and a former heavysmoker (20 pack-years, ceasedtwomonthsprior), wasadmitted to the emergency room for severerespiratorydistress and hemodynamicinstability. Twomonthsprior to admission, hehad progressive dyspneainitiallyclassified as mMRC stage 1, evolving to restingdyspneatendaysbeforehospitalization. This wasaccompanied by productive greenishcough, dysphonia, dysphagia, headaches, and cervical and epigastricswelling, all in an afebrilecontextwith major general condition deterioration (20 kg weightloss over twomonths, profoundasthenia), withoutpruritus.

In the 24 hourspreceding admission, dyspneaabruptlyworsened (mMRC stage 4) with the onset of severeorthopnea, prompting consultation with a generalpractitioner. A thoracic CT scan performedtwodaysprior, initiallyprescribed by thispractitioner, revealed a large mediastino-hilopulmonary mass, leading to an emergency referral to ourspecialized unit.

ClinicalExamination on Admission :

The patient wasagitated, orthopneic, and cyanotic, conscious but confused. Vital signsincluded a heart rate of 128 bpm, blood pressure 85/55 mmHg, temperature 37.8 °C, respiratory rate 30 breaths/min, and oxygen saturation 85% in room air.

Physical examinationrevealedbilaterallowerlimbedema (pitting, soft, pale), laboredbreathingwithsuprasternal and intercostal retractions, thoraco-abdominal rocking, absent rales or stridor, muffledheartsounds, paradoxical pulse, and weakperipheral pulses.

A tumor syndrome wasnoted, associatingfirmbilateral cervical swelling (jugulocarotid and tracheal), epigastric mass, hepatomegaly, and leftjugularvein distension, without palpable supraclavicular or axillarylymphadenopathies.

A superior vena cava syndrome waspresent, characterized by cape edema, conjunctivaledema, headache, confusion, and agitation (WHO performance status 3).

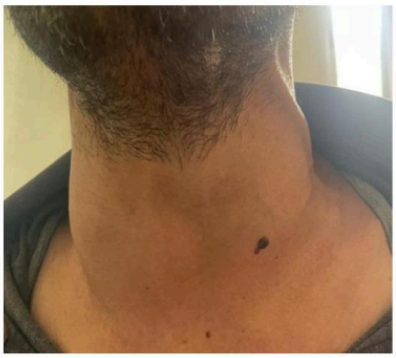

Figure 1 : Bilateral firm jugulocarotid and pretracheal cervical masses with left jugular vein distension .

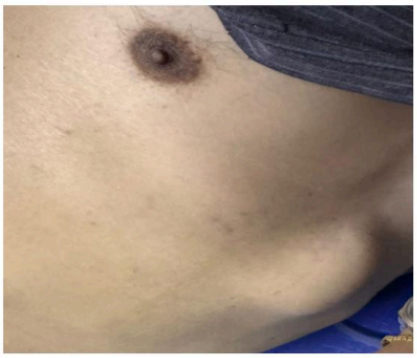

Figure 2 : Fixed, soft, and painless epigastric mass .

- This clinicalpresentationsuggestedcardiactamponadeassociatedwithsuperior vena cava syndrome.

- Transthoracicechocardiographyrevealed a large circumferentialpericardial effusion measuring 35 mm anteriorly and 32 mm posteriorlywithcompletediastolic collapse of the right atrium and right ventricleindicatingcriticallyelevatedintrapericardial pressure markedrespiratory variations of transvalvulardoppler flows including mitral inflowwithinspiratory E-wavereduction of 55% exceeding the pathologicalthreshold of 40% according to ESC and tricuspidinflowwithinspiratory E-waveincrease of 85% compatible withtamponadeinspiratorydecrease of aortic flow velocities by 30% adilatedinferior vena cava measuring 28 mm withlessthan 5% inspiratory collapse reflectingelevated central venous pressure paradoxicalinterventricular septal motion with right ventriculardiastolic compression and preservedleftventricularsystolicfunctionwith an ejection fraction of 58%.
Thesefindingsstronglysuggestedseverecardiactamponadewith major hemodynamic compromise.

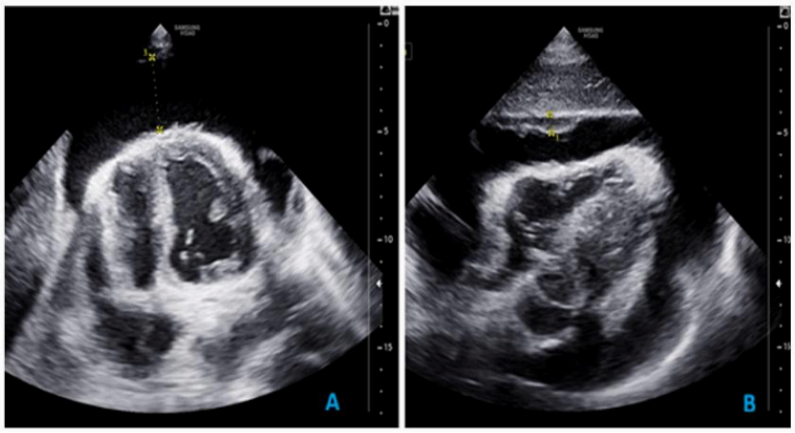

Figure 2 : Transthoracic echocardiographic views demonstrating pericardial effusion.

(A) Apical four chamber view showing a large pericardial effusion with swinging heart motion .

(B) Subcostal view showing a large circumferential pericardial effusion with probable pericardial metastasis.

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70 - The thoracic CT scan showed a large infiltratingmediastino-hilopulmonary mass invadingmediastinalvessels
71 and the pericardium, with a large pericardial effusion and features suggestive of an aggressivemalignant process
72 **(Figure 3 and Figure 4).**

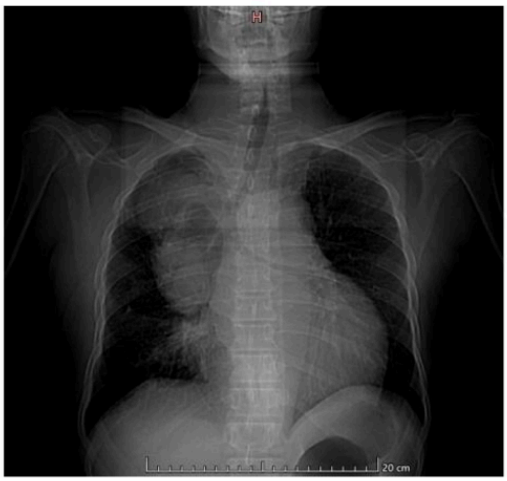

Figure 3: Coronal CT scan of the thorax

A large tissular mass forming a mediastino-hilopulmonary ganglio-tissular complex, with heterogeneous enhancement, irregular and partly lobulated contours, and internal calcifications. The lesion measures approximately 120 × 127 × 103 mm (height × anteroposterior × transverse).

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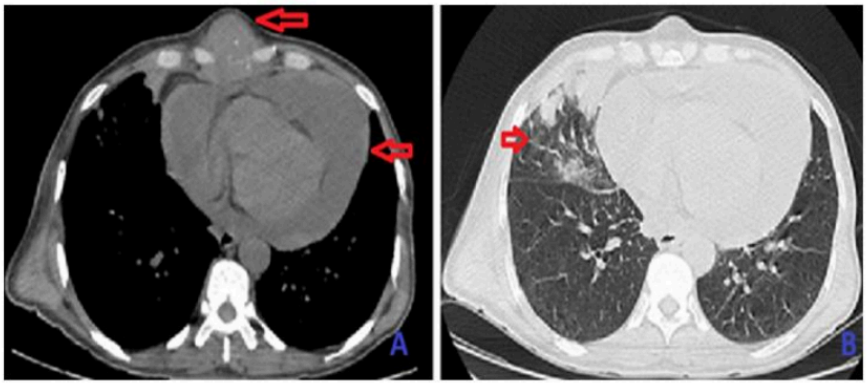

Figure 4: Sagittal CT scan of the thorax

(A) A large right mediastino-hilopulmonary tumor infiltrating the mediastinal vascular structures, including the pulmonary arteries and superior vena cava, was identified. This mass was associated with a massive pericardial effusion measuring up to 43 mm in maximal thickness, with suspicious nodular thickening of the parietal pericardium.
An anterior chest wall mass with irregular, lobulated contours and heterogeneous enhancement, invading the xiphoid process of the sternum, measured approximately 58 × 53 × 52 mm (H × AP × T).

(B) Multiple irregular areas of parenchymal consolidation without air bronchogram, associated with septal thickening within the middle lobe, and scattered micronodules throughout both lung fields.

- While an urgent pericardial drainage wasbeingprepared, the patient experienced abrupt hemodynamicdecompensationwithprofound hypotension, bradycardia, and thenpulselesselectricalactivity. Deathwasdeclared 30 minutes aftercardiacarrestdespite intensive resuscitationmaneuvers.

IV. Discussion

Mediastinaltumorsrepresent a heterogeneous group of neoplasmscharacterized by diverse histological types and a complexanatomic-clinicalpresentationgiven the tightanatomical confines involving vital structures such as the heart, greatvessels, thymus, esophagus, lymphnodes, and surrounding connective tissues(5). Thesetumorsoftenremainclinically silent untilreachingadvanced stages characterized by life-threatening complications like cardiactamponade and superior vena cava syndrome, whichsignificantlyworsen the patient'sprognosis if diagnosisisdelayed(6).

In this case, the patient exhibited a voluminousmediastino-hilopulmonary mass directlyinvading the superior vena cava with intraluminal thrombosis and occlusion, pericardial infiltration withnodularthickening, and compression of the right pulmonaryarteries, whichis consistent withimaging profiles of aggressivemediastinalmalignanciesdescribed in recentliterature(7). The tumor'smetastatic nature washighlighted by the presence of large necroticmediastinallymphadenopathies and a right adrenalmetastasis, patterns commonlyobserved in retrospective analyses whereadvanceddiseasefrequentlypresentswithsuchdissemination and systemicspread(8).

Echocardiographicfindingsrevealed a large circumferentialpericardial effusion and hallmarksigns of cardiactamponade, includingcompletediastolic collapse of the right atrium and right ventricle, respiratory variations in mitral and tricuspid Doppler flows beyondpathologicalthresholds, and paradoxicalinterventricular septal motion, all aligningwith the 2024 ESC guidelines and recent case seriesdescribingtumor-inducedpericardialtamponade(2). The preservation of leftventricularsystolicfunctionunderscores the typicalhemodynamic impact of tamponade in thiscontextbeforeeventualdecompensation(9).

Notably, the patient alsopresentedwith an epigastric mass, whichlikelyreflectedeither direct tumor extension or a metastatic site, supporting the aggressive and advanced stage of the disease(10). Althoughbiopsy of this mass could have yieldeddefinitivehistological confirmation, the patient'scriticalhemodynamicinstabilityrendered invasive diagnostic procedurescontraindicated at that time. This clinical scenario reflects the significant challenge in managingunstable patients withmediastinaltumorscomplicated by tamponade and SVC syndrome, where urgent stabilizationtakespriority over invasive diagnostics, a principleemphasized in currentmultidisciplinary management recommendations(11).

Therapeutic options in suchadvanced and life-threateningpresentationsremainlimited(7). Current 2025 guidelines emphasize the role of surgery, chemotherapy, and radiotherapytailored to histologicalsubtype and disease stage, withsurgerypreferred for resectabletumors and systemictherapies for lymphomas or unresectable masses to improvesurvival(12). However, in cases complicated by tamponade and SVC syndrome, high earlymortalitypersists, highlighting the vital need for earlierdetection and intervention, especiallyamong at-risk populations withchronic solvent exposure and heavy smoking histories, in whompreventiveoccupationalhealthmeasures and surveillance couldimproveoutcomes(4).

V. Conclusion

This case exemplifies the rapid progression and fatal potential of mediastinaltumorscausingcriticalcardiopulmonary complications. It emphasizes diagnostic challenges, especiallywhen invasive procedures are precluded by instability, and reinforces the importance of coordinatedmultidisciplinary care, alongside proactive prevention and earlydiagnosisstrategiesbased on up-to-date evidence.

VI. Patient consent

I confirm in myown wordsthatthereis no legalconflict, the consent wasobtained and declarethat the familywasinformed of all the written information related to the patient'smedical case, and acceptit to bepublished.

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