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RESEARCH ARTICLE

"CONCURRENT H1N1 INFLUENZA AND STAPHYLOCOCCUS AUREUS INFECTIVE ENDOCARDITIS IN A PATIENT WITH MULTIPLE COMORBIDITIES: A CASE REPORT AND LITERATURE REVIEW"

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Abstract

Infective endocarditis (IE) in the context of H1N1 influenza imposes clinical challenges in the diagnosis and management of both conditions. The symptoms on presentation of IE and H1N1 are similar and may include fever and malaise, which may cause the diagnosis of IE to be delayed, and thus at the time of diagnosis, the disease might be at an advanced stage (1). Co-infection enhances inflammation and has more severe cardiac and systemic manifestations, resulting in higher morbidity and mortality (2). Infection with H1N1 flu has been shown to be immunosuppressive making IE more severe. Also, the treatment of H1N1 with antiviral drugs could interact with antibiotics required to treat IE (3). Moreover, the presence of H1N1 respiratory infection could cause a delay in the required diagnostic procedures of IE. This further establishes the rationale of, increased clinical scrutiny, combined diagnostic methods, and a multidisciplinary team approach in order to provide the best care to patients with both these infections.

Introduction:-

Case Presentation:

A 54-year-old male, with a known history of type 2 diabetes mellitus, hypertension, and hyperthyroidism, presented to the hospital with complaints of fever, cough, and progressively worsening dyspnoea over the past three days. Upon examination, the patient appeared ill, was febrile, and exhibited dyspnoea. Auscultation of the heart was normal, but the chest was severely wheezy. A chest X-ray (Figure 1) revealed no consolidation, and laboratory results showed elevated inflammatory markers. Respiratory screening tested positive for H1N1.

The diagnosis of acute bronchitis caused by H1N1 infection was made, and the patient was commenced on oseltamivir, bronchodilators as well as fluids and antipyretics. He was administered the selected treatment, though during the subsequent days, his general state did not improve – inflammation markers remained elevated, and fever did not subside. An antibiotic was given to tackle the suspected secondary bacterial infection but again there was no improvement.

We did not see any improvement in the patient's condition by the seventh day, hence, a preliminary FUO assessment was done that included pan cultures and a transthoracic echocardiogram. The echocardiogram was negative for vegetation; however, there was moderate mitral valve regurgitation, and mild aortic regurgitation as noted. Blood culture taken on admission was negative however the new culture was positive for gram-positive cocci

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though not confirmed. A second blood culture sample was collected 24 hours later and both cultures yielded the organism identified as Staphylococcus aureus.

Here, one major Duke criterion and two additional minor criteria of IE were fulfilled, as per the modified Duke criteria for IE. A transoesophageal echocardiogram (TEE) was needed to confirm the diagnosis, but it was delayed due to confirmed H1N1 bronchitis with acute bronchospasm and mild hypoxia. Apiece further, infectious control measures were implemented, and the patient was started on intravenous anti-staphylococcal antibiotics, flucloxacillin, and gentamicin besides full respiratory support.

Respiratory condition improved within a week and a TEE was carried out and it revealed infective endocarditis by the presence of vegetation on the non-coronary cusp of the aortic valve and the tricuspid valve (Figure 2). Vancomycin was included in the treatment plan. The patient then continued to receive intravenous antibiotics for an additional four weeks; treatment rendered the patient's clinical state more stable, new blood cultures yielded negative results; a TEE conducted three weeks later demonstrated no intracardiac complications. He was prescribed oral antibiotics to use for the next 2 weeks.

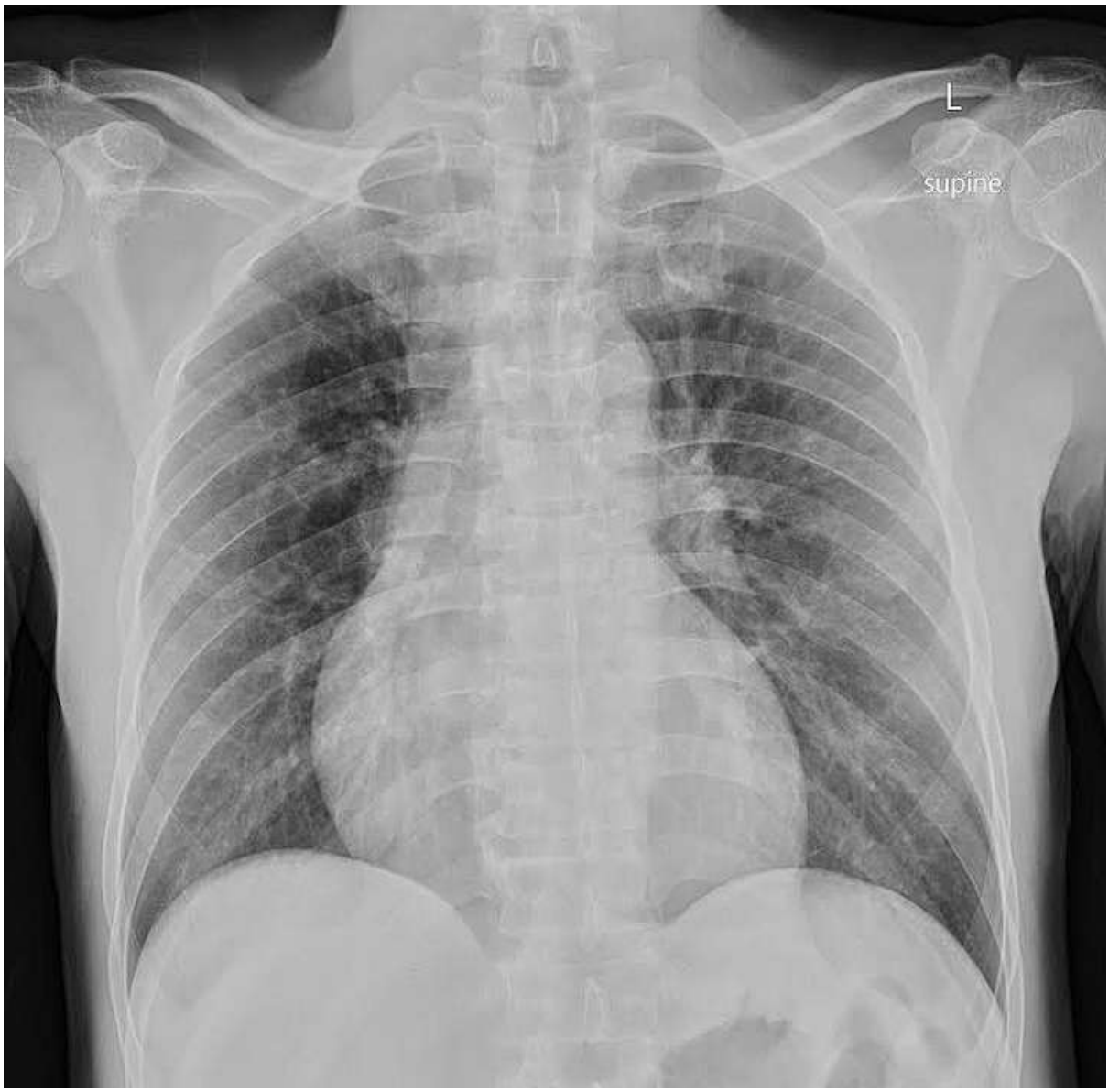

Figure 1:- Chest X-ray Clear both lung fields with no evidence of focal pulmonary lesions detected, however, prominent vascular markings are noted probably representing bronchitis.

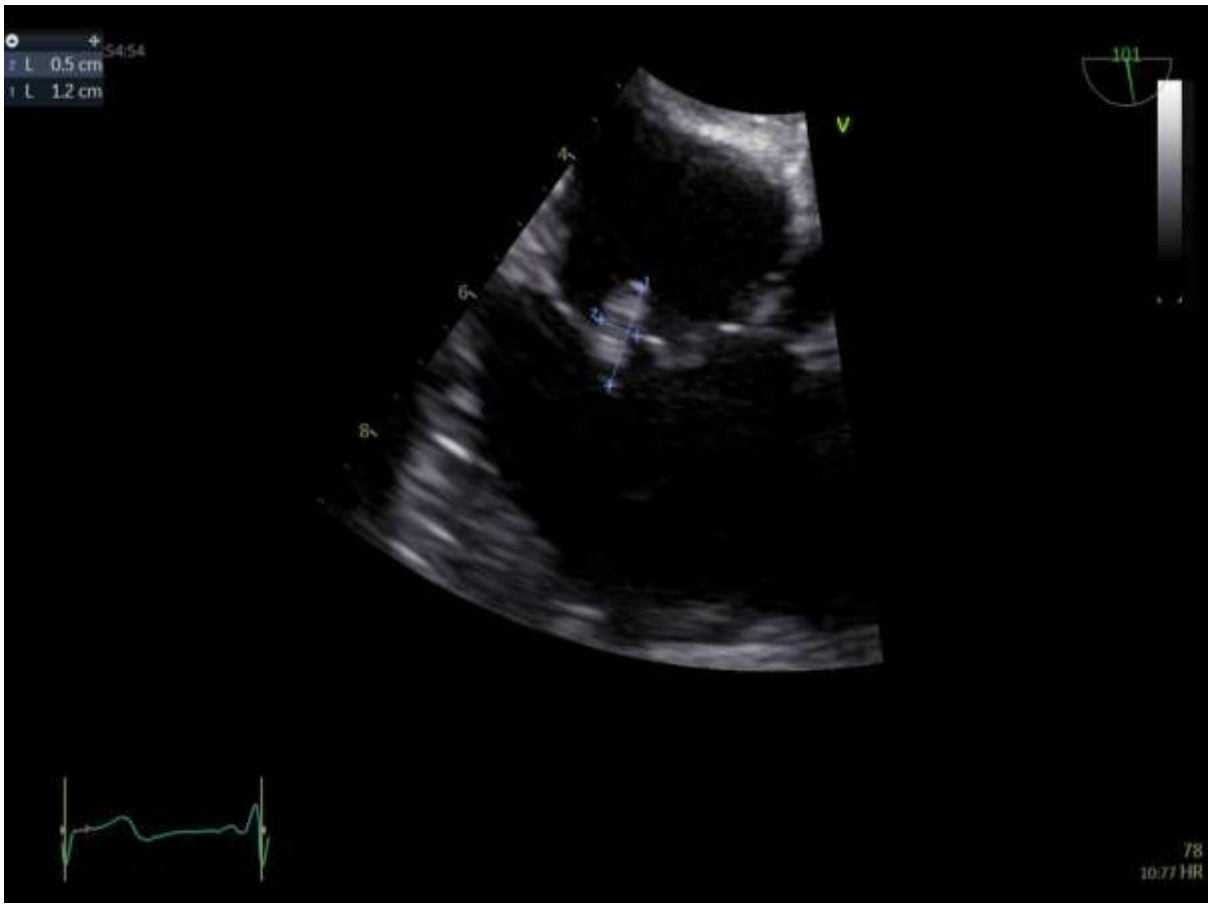

Figure 2:- Vegetation on the tricuspid valve.

Discussion:-

This case brings out how multiple comorbidities and infectious diseases could interact with each other, and how the diagnosis and management could be complicated. The patient under consideration is a 54-year-old male with a past medical history of type 2 DM, hypertension, and hyperthyroidism who came with symptoms pointing towards a respiratory infection. These symptoms presented in this patient via fever, cough, and progressive dyspnoea that met the diagnosis for H1N1 infection at first instance without complications. Evidence of this included a raised inflammatory marker as well as having a positive respiratory screen for H1N1 (4).

The patient was managed with antiviral drugs and supportive care using oseltamivir but the patient's condition did not improve and a concern for a secondary bacterial infection emerged. This is not uncommonly seen in patients with influenza where complications with secondary bacterial infections may occur especially in patients with other associated diseases and disorders such as diabetes and hypertension that suppress immune responses (1).

Increasing inflammatory markers and the persistence of fever led to further workup. The first TTE demonstrated valvular dysfunction without vegetation, and this can be expected as TTE is known to be less sensitive than TEE for vegetation detection; this is particularly true in the presence of structural heart diseases (5). Positive blood cultures for Staphylococcus aureus and the patient partially fulfilling the modified Duke criteria for IE made the diagnosis a possibility.

There were some challenges with the respiratory status of this patient. An acute H1N1 bronchitis complicated the management of the patient by triggering severe bronchospasm as well as mild hypoxic episodes, which postponed the TEE, a key diagnostic test for IE. This delay could have unfavourable consequences; accurate early diagnosis and treatment with suitable antibiotics in IE are of great importance to avoid complications. The antibiotic agents

used to target Staphylococcus aureus in this patient were flucloxacillin and gentamicin, later the coverage was broadened with vancomycin to match the infection severity (6).

A brief review of the literature reveals similar previous cases of viral illnesses, especially influenzas, complicated by secondary bacterial infection which worsens the outcome. Research has shown that co-infections can exacerbate inflammatory responses and increase the risk of worse outcomes, this emphasizes the need for close observation and prompt intervention (2; 3).

A TEE was performed after improvement in the patient's respiratory status which confirmed IE diagnosis by detecting vegetations on the aortic and tricuspid valves. The subsequent intravenous therapy with antibiotics for 4 weeks followed by oral antibiotics according to current recommendations in the guidelines; highlights the importance of prolonged targeted antibiotics therapy to eradicate the infection and prevent relapses (2).

Conclusion:-

The clinical lessons which can be derived from this case:

1. We should always be aware of the risk of secondary bacterial infections in patients with viral respiratory infections, especially when they have other health problems.
2. It's crucial to thoroughly investigate persistent fever and high inflammatory markers, even if the initial diagnosis seems clear.
3. Dealing with complex cases involving multiple health issues is tough, as one condition can greatly affect the approach to diagnosing and treating another.

Overall, this case shows the importance of having a multidisciplinary team approach when managing patients with multiple health conditions. It reminds us to stay alert for secondary bacterial infections during viral illnesses.

The patient's recovery, with complete resolution of his infection and clear follow-up blood cultures, highlights the success of careful and adaptable clinical management.

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