Churg Strauss Syndrome presenting as an Eosinophilic Pleural Effusion

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Abstract: ***Churg-Strauss syndrome (CSS) is a rare form of systemic vasculitis affecting themedium to small sized vessels. The diagnosis of this disease is based mainly on clinical grounds; comprising of asthma, peripheral blood and tissue eosinophilia, rhinosinusitis and signs of vasculitis in major organs. A 48 year old female patient on treatment for bronchial asthma, presented with a bilateral pleural effusion. The analysis of the fluid revealed an eosinophilic exudate (67%). The additional investigations revealed a raised Immunoglobulin E (IgE) levels and p-ANCA positivity. The presentation of CSS as eosinophilia in body fluids is rare and may herald the onset of the vasculitic phase of the disease.***

Keywords: Churg-Strauss syndrome, eosinophilia, pleural effusion.

1. Introduction

Churg-Strauss syndrome (CSS) is a multisystem disorder comprising of chronic rhinosinusitis, asthma and peripheral blood/ tissue eosinophilia.The lung remains the most frequently affected organ, followed by the skin. Recent studies have shown a myriad of organ systems affected by this disease, including the cardiovascular, gastrointestinal, renal, and even the central nervous system. Asthma is the cardinal feature of CSS and usually precedes the vasculitic phase by a decade. Pleural effusion as a manifestation of CSS is however infrequently mentioned in the literature [1]. We recently faced a diagnostic challenge while analyzing the pleural fluid in a patient with a long standing bronchial asthma.

2. Case report

A 48 year old lady was admitted to emergency unit of the hospital with an acute exacerbation of exertional dyspnea associated with wheeze. She also had a mild productive cough with streaky hemoptysis. The examination findings of other systems were within normal limits. On physical examination, the patient was tachypneic even at rest. The pulmonary examination revealed diffusely decreased breathing sounds, inspiratory crackles and dullness to percussion with decreased vocal fremitus. There accessory muscles of respiration were actively used to compensate for the dyspnea. The level of oxygen saturation (SPO_2) was low (64%). The chest radiograph showed a bilateral pleural effusion (figure 1). There was blunting of the costo- phrenic angle (CP).

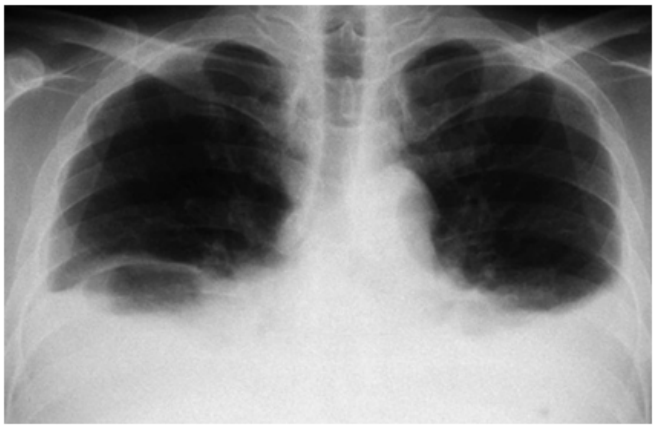

Figure 1: Chest radiograph (postero-anterior view) showing a bilateral pleural effusion and partial collapse of the lung parenchyma.

A diagnostic and therapeutic thoracocentesis was performed which yielded approximately 750ml of fluid. The respiratory symptoms receded to a marginal extent and the fluid was sent to the laboratory for hematological and biochemical analysis. The thoracocentesis showed the following features (table 1).

Table 1: Pleural fluid analysis

Characteristic feature	*Findings*
Colour	Yellowish with red streaks
Protein	5.7 mg/dL
LDH	811U/L
Glucose	113mg/dL
pH	5.9
Pl. fluid protein / Serum protein	0.92
Pl. fluid LDH* / Serum LDH*	1.33

The pleural fluid analysis established that it was an exudative effusion. Ratio of the pleural fluid lactate dehydrogenase and protein to serum lactate dehydrogenase and protein (Light's criteria) met the requisites for an exudative etiology [2]. The total leucocyte count of the pleural fluid was 688 cells/ cu.mm. The differential leucocyte count revealed 67% eosinophils against a background of reactive mesothelial cells and red blood cells (figure 2).

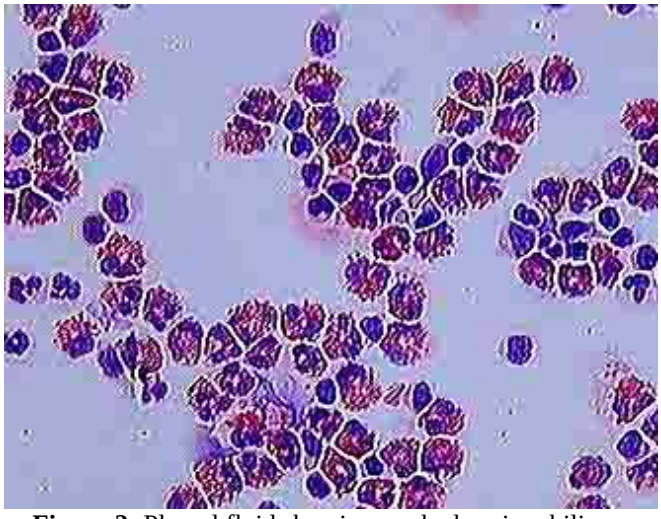

Figure 2: Pleural fluid showing marked eosinophilia against a background of RBCs. (Leishman; x200)

An impression of eosinophilic effusion was given on the report. However, the clinician was requested to provide additional details in order to have a correlation with the fluid analysis. The hemogram showed an anemic profile (Hb: 6.2 gm%) with mild leucocytosis (16,500 /mm^3) and mild thrombocytopenia (platelets: 120,000 /mm^3).The peripheral blood film was reviewed and the differential leucocyte count showed marked eosinophilia (51%).The rise in eosinophil count was also reflected by an increment in the absolute eosinophil count (8.4 x10^3).

Additional investigations included liver and renal function tests which were within normal limits. The coagulation profile and electrolytes were also unremarkable. The erythrocyte sedimentation rate (ESR) was 33mm/hour. The bronchoalveolar lavage (BAL) fluid also showed eosinophilia. No malignant cells were detected.Considering all the clinical and laboratory data, we offered a differential diagnosis of an allergic drug reaction, fungal and parasitic infections and eosinophilic pneumonia. Infections did not fit into the clinical profile as the patient was afebrile and the blood cultures for bacteria and fungi were negative. The allergic reaction needed to be confirmed by the clinicians. A serum Immunoglobulin E (IgE) assay was requested which was elevated (12.4 IU/ml). Hence, a working diagnosis of allergic reaction with an acute exacerbation of asthma was considered and the patient was placed on steroids.

The repeat blood smear and fluid analysis after 3 days of initiation of treatment continued to show prominent eosinophils. Hence, a possibility of Churg-Strauss syndrome (CSS) was considered. The serum analysis of perinuclear anti-neutrophil cytoplasmic antibody (p-ANCA) was positive. c-ANCA was negative. The serum complement levels of C3 and C4 were normal. The patient did not give consent for a lung biopsy and was discharged against medical advice. Thus the work-up for CSS could not be completed. At the time of writing this article, no follow up of this case was available.

3. Discussion

The Churg-Strauss syndrome (CSS) also referred to as eosinophilic granulomatosis with polyangiitis (EGPA), is a multisystem disorder characterized by chronic rhinosinusitis, asthma, and prominent peripheral blood eosinophilia [3-7]. The disease bears the name after pathologists Jacob Churg and Lotte Strauss in 1951, identified 13 patients with disseminated necrotizing vasculitis occurring in patients with severe asthma and hypereosinophilia [8]. Conventionally, the lung has been the primary target organ of this disease. The extrapulmonary involvement includes many solid organs but a body cavity involvement is seldom reported.

The disease develops in several sequential phases, although these phases are not always clearly distinguishable. The firstphase (prodromal) is evidenced by atopic disease, allergic rhinitis, and asthma [9]. In the second phase, tissue eosinophilia supervenes, in form of pulmonary infiltrates or eosinophilic infiltration of the gastrointestinal mucosa. At this stage, the clinical picture is indistinguishable from other hypereosinophilic disorders like chronic or acute eosinophilic pneumonia, idiopathic hypereosinophilic syndrome [10]. In the present case, the patient was in the second phase of the disease since a tissue eosinophilia was demonstrable (pleural fluid and in the BAL specimen).

The final phase is characterized by vasculitis. It is widely regarded that a diagnosis of CSS is possible only this final phase.In our case, a tissue diagnosis was not available. Yet, the other criteria for the diagnosis of CSS were present. The pertinent question then, is whether the eosinophilic effusion is a crucial event which signals the transition into the vasculitis phase? Pleural effusion has been described as a manifestation of CSS with a frequency of 29% [1], but an eosinophilic effusion has not been scrutinized as an important feature in the clinical progression of the disease.

The high serum levels of p-ANCAin the patient do support the progression of the disease. Additionally, the elevated IgE assay also implicate a vasculitic phase of the disease [11], both these features were present in our case.

4. Conclusion

An eosinophilic pleural effusion is not an everyday phenomenon. While common differential diagnoses are considered, a background of bronchial asthma must alert both the clinician and hematopathologist about the possibility of a Churg-Strauss syndrome (CSS). Moreover, this event may herald the progression to the final vasculitic phase of the disease. More detailed studies are necessary to substantiate this hypothesis.

References

[1] Loughlin J, Cole J, Rothman K, JohnsonE, "Prevalence of serious eosinophiliaand incidence of Churg-Strauss syndrome Ina cohort of asthma patients", Ann Allergy Asthma Immunol; 88: 319-325, 2002.
[2] Light RW, et al, "Pleural effusions: the diagnostic separation of transudates and exudates", Annals of Internal Medicine: vol.77 (4), pp: 507–513, 1972.
[3] Churg A, "Pulmonary angiitis and granulomatosis revisited", Hum Pathol: 14: pp 868, 1983.
[4] Sinico RA, Bottero P,"Churg-Strauss angiitis". Best Pract Res Clin Rheumatol ; 23:pp 355,2009.
[5] Pagnoux C, Guilpain P, Guillevin L,"Churg-Strauss syndrome", CurrOpin Rheumatol; 19:25,2007.
[6] Keogh KA, Specks U, "Churg-Strauss syndrome". Semin RespirCrit Care Med; 27:148, 2006.
[7] Guillevin L, Cohen P, Gayraud M, et al,"Churg-Strauss syndrome. Clinical study and long-term follow-up of 96 patients", Medicine (Baltimore) ; 78:pp: 26, 1976.
[8] Churg J, Strauss L, "Allergic granulomatosis, allergic angiitis, and periarteritisnodosa". Am J Pathol; 27: pp 277, 1951.
[9] Jennette JC, Falk RJ, Bacon PA, et al, "2012 revised international Chapel Hill consensus conference nomenclature of vasculitides", Arthritis Rheum; 65:pp :1,2013.
[10] Pagnoux C, Guillevin L,"Churg-Strauss syndrome: evidence for disease subtypes?",CurrOpin Rheumatol ; 22:pp 21,2010.
[11] Manger B, et al, "IgE-containing circulating immune complexes in Churg-Strauss vasculitis". Scand J Rheumatol ; 21: pp 369-373,1975.