Mycoplasma Pneumoniae infection complicated by multiorgan dysfunction Syndrome (MODS), with a favorable recovery

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Abstract- *Mycoplasma pneumoniae (MP)* is a common pathogen in cases of atypical pneumonia. Most individuals with Mycoplasma pneumonia run a benign course, with non-specific symptoms of malaise, fever and non-productive cough that usually resolve with no long-term sequelae. Multi organ dysfunction is not commonly seen in Mycoplasma pneumonia infection. We, report a case of Mycoplasma pneumonia complicated with multiple organ failure in a previously healthy woman. She had severe hemolysis, acute respiratory distress syndrome and acute renal failure. She had complete recovery with intensive management in an intensive care unit.

I. INTRODUCTION

Mycoplasma pneumoniae (MP) is the causative agent of community acquired pneumonia in children and adults (1, 2). It has a worldwide prevalence which tends to occur in epidemics. Mycoplasma infection commonly affects the respiratory tract and most individuals run a benign course. Symptoms of Mycoplasma pneumonia include fever, malaise, sore throat and a non-productive cough that usually resolve without sequelae. (3) It is well recognized that the vast majority of Mycoplasma infections remain undiagnosed. However, MP infection is accompanied by extra pulmonary manifestations in about 20-25% of infected individuals. (4) Several systems can be affected simultaneously but, gastroenteritis, conjunctivitis, uveitis, hepatitis, Steven Johnson syndrome and acute urticaria are uncommon. Severe hemolytic anemia**,** Adult respiratory distress syndrome and acute kidney injury are rarely seen in patients with Mycoplasma pneumonia. (5) Here, we report a case of *Mycoplasma pneumoniae* pneumonia (MPP) complicated by multiple organ failure with a favorable outcome after intensive treatment. **Key words:-Mycoplasma pneumoniae, Multiorgan dysfunction, ARDS, Acute kidney injury**

II. CASE REPORT

A 43-year-old Saudi female teacher previously healthy was referred to our hospital with history of cough, blood tinged sputum and breathing difficulty. She was conscious, oriented, ill looking and tachypneic. She had pallor and ictrus. Her BP was 130/80 mmHg, heart rate 90/minute and respiratory rate 20/minute. Systemic examination revealed a moderate splenomegly there was no hepatomegly. Chest revealed diffuse B/L crepts, no pleural rub or bronchial breathing was heard on auscultation. Her CVS and CNS examination was normal. Investigations revealed Hemoglobin of 5.0gm% ,TLC 10 / mm3, platelet 150/mm3 DLC:- Polymorphs 80%, Lymphocytes 15%, eosinophils, 4%, basophiles 1%, platelets 180/mm3, Reticulocyte 8%, Bilirubin 6mg/l, direct 1.5mg/l, indirect 4.5mg/l, ALT 40 u/l, AST 35 u/l, Alkaline phosphatase 145 u/l, LDH 700 u/l, CPK 200 u/l, Calcium 2 mmol/l, Phosphorus 1.2mmol/l, urea 20 mmol/l, creatinine 200 umol/l, CRP 250 u/l, urine examinations revealed albumin+, Rbc's 5-8/hpf, Pus cells 40-50/ hpf, no casts. 24 hr urine protein was less than 1 gm on two occasions. Direct coombs test was positive and coaglogram was normal. Chest x-ray revealed diffuse interstial infiltrates more on right side(Fig 1) ABG Ph 7.3, Pco2 34mmHg, Po2 80mmHg,Spo2 88% on room air and 96% with 5 litre oxygen through nasal canula. Ultrasonagaphy of abdomen revealed hepato splenomegly, no lymphadenopathy or ascites. She was put on oral azithromycin 500 mg daily, IV Pipercillin 4.5 gram 6 hourly. Predinisolone 80 mg daily was added in view of possible immune hemolytic anemia. She showed a clinical improvement initially with antibiotic administration however, on day 3rd of her hospital admission her throat was noted to be inflamed. There was further clinical deteoration with worsening CXR changes involving the other lung.(FIG 2) She was more tachypneic with a respiratory rate of up to 30 breaths per minute, tachycardic with a heart rate of 110/minute and remained pyrexial. ABG revealed a fall in P02 to 60mmHg, Pco2 45mmHg, Spo2 88% on nasal musk oxygen. CRP remained elevated at 250 mg/L. She was diagnosed with acute respiratory distress syndrome (ARDS) based on CXR findings which showed bilateral alveolar infiltrates (Fig 2) and PO2 of 60 mmHg on high flow oxygen. She continued to deteriorate and required invasive ventilation. Additional laboratory work up obtained during patient's hospitalization showed normal anti-dsDNA, ANCA, antinuclear antibody, autoantibody screen, rheumatoid factor, ASO and complement components C3, C4. Tests for hepatitis A, B, and C, and CMV, EBV, and HIV were negative. Bacteriological cultures for sputum and blood were sterile. Cold agglutinins were detected in serum at a dilution of 1/64. Serum for Mycoplasma IgM, taken at

day 1st of the presentation, was negative however a subsequent sample taken at day 5 of the presentation was positive. These serological results supported confirming *Mycoplasma pneumonia* as the cause of her acute respiratory distress syndrome, hemolytic anemia and acute kidney injury. She was started with Hemodialysis and ultra filtration via a temporary jugular vein catheter for her progressive increasing urea, creatinine, metabolic acidosis, oliguria and hyperkalemia. She received seven (07) units of group specific pack red cell transfusion. The cross match of blood was also a difficult process due to possible cold agglutinin produced by her infective lesion of chest .She improved over the course of her ten day admission to the Intensive Care Unit. Oral predinisolone 80 mg daily, IV pipercillin was continued. She developed predinisolone induced secondary diabetes mellitus which, was managed with tab gliclazide 80 mg twice a day. On day 14th she started forming more urine. Patient showed signs of improvement. There was neither drop in her hemoglobin nor any rise in bilirubin. Her urea and creatinine were un stable and had mild metabolic acidosis. She was shifted out of intensive care unit and was dialysed regularly 3hr 3 times a week with ultra filtration as required. Fallow up chest x-rays showed clearing (Fig 3). Her urine output improved and creatinine got stabilized round at 180 umol/l. She was discharged from hospital with a Hemoglobin of 10.0gm%, creatinine 180 umol/l and bilirubin 2mg/l. Fallow up at two months in outpatient clinic revealed normal kidney functions, liver functions and a Hemoglobin of 10gm%. Fallow up chest X-ray was normal (Fig4). Hence, she made a complete recovery with an aggressive therapy for 21 days in hospital.

Table 1. Patient's laboratory results during hospitalization

Parameter	admission	1st Week	2nd Week	3rd Week
Hb Gm%	5	7	8	10
TLC/mm3	10	11	9	7
MCV	95	98	87	85
Neutrophils /mm3	80	85	76	70
Lymphocytes /mm3	15	13	18	20
Platelet/mm3	180	150	120	110
Reticulocyte %	8	12	6	2
Urea mmol/l	20	55	50	15
Creatinine umol/l	200	700	850	180
Total Bilirubin mg%	6	8	4	2
Direct Bilirubin mg%	1.5	3.5	1.8	0.75
ALT U/L	40	55	45	35
AST U/L	35	45	50	40
LDH U/L	700	500	450	250
CPK U/L	200	400	380	250
Phosphorus mmol/l	3.5	3	2.5	1.8
Calcium mmol/l	1.8	1.5	1.7	2
Anti globulin test	Positive	Positive	Positive	Negative
Cold Agglutinin	Negative	Positive	Positive	Negative
CRP mg/l	250	300	180	80

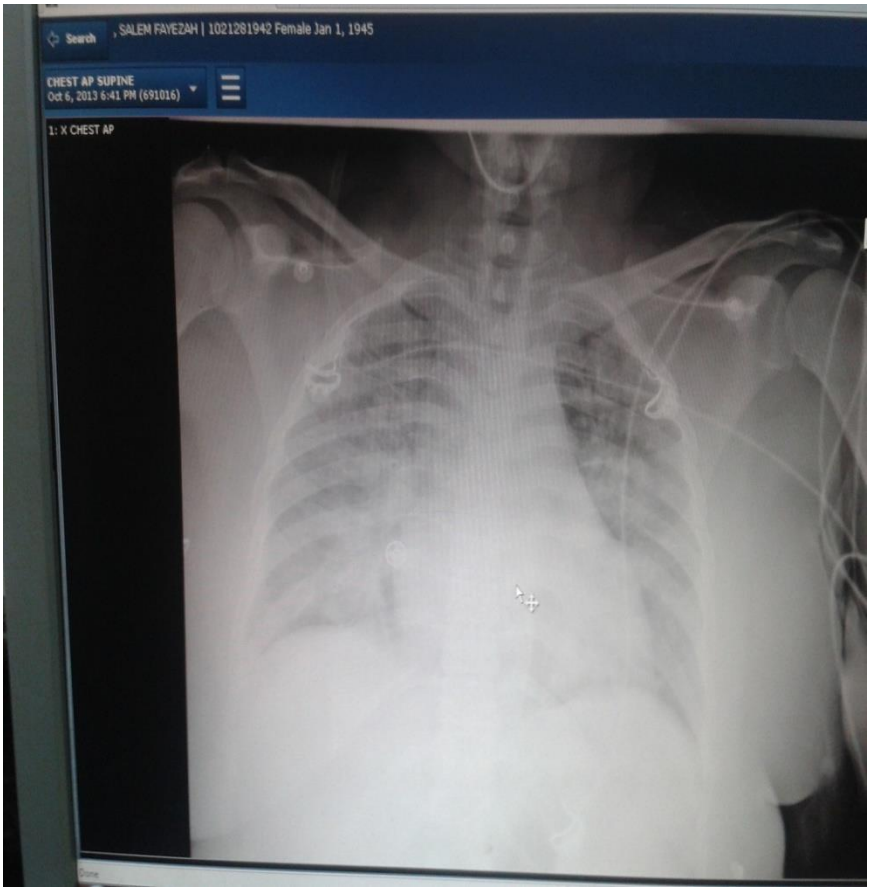

Fig:-1 Chest x-ray day of admission showing B/L pneumonia

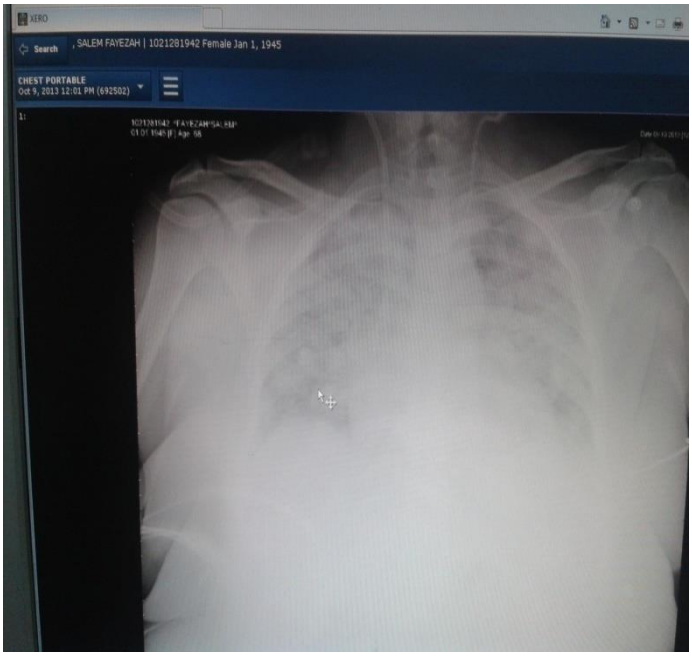

Fig :-2 Chest X-Ray extensive B/L pneumonia and Rt.Jugular vein catheter for dialysis

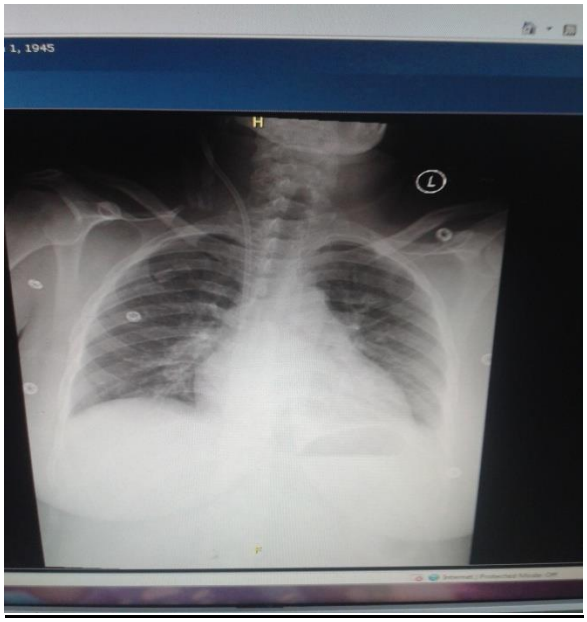

Fig:-3 Chest X-Ray showing clearing of B/L pneumonia and jugular dialysis catheter

III. DISCUSSION

The case presented here represents fulminent atypical pneumonia due to *M. pneumoniae (MP)* in a formerly healthy young adult complicated by severe hemolysis, acute respiratory distress syndrome (ARDS) and acute kidney injury (AKI). Atypical pneumonia due to (M. pneumoniae, Chlamydia pneumoniae, or Legionella pneumoniae) has been thought to account for 7-20% of community-acquired pneumonia for which a pathogen cannot be identified [6]. Pneumonia develops in 3-10% of patients infected with M. pneumoniae. (7) Diagnosis of atypical pneumonia is often difficult since culture or direct detection of the suspected pathogen is time consuming and not readily available. No clinical or radiographic features reliably distinguish M. pneumoniae from pneumonia of any other etiology. [8] In most cases, confirmation of diagnosis is based on serologic methods, requiring high acute antibody titers or paired serum samples for definitive diagnosis. Cold agglutinin is a non-specific laboratory investigation which is raised in about 75 percent of cases of Mycoplasma pneumonia. Serum titer levels of more than 1:64 in a person with a lower respiratory tract infection would highly suggest Mycoplasma pneumonia infection

Extra pulmonary abnormalities can be an important part of Mycoplasma disease. These manifestations include skin rash, joint involvement, heart disease, central nervous system, renal and hematological involvement (9-10). Unusual and extra pulmonary manifestations of the Mycoplasma pneumoniae (MP) infection with Multiorgan involvement have been reported only infrequently. (11, 12) The exact patho mechanism of the Mp infection-induced multiple organ failure remains unclear. It has been postulated that the cytadherence of MP, cell invasion, cytotoxicity, immune response, and cytokine production might be involved in its pathogencity. (12, 13) Although most Mycoplasma pneumonia infections resolve without complications but, rarely can have a fulminent course and get complicated by Multiorgan dysfunction. Hemolytic anemia is the most common hematologic manifestation, and subclinical evidence of hemolytic anemia is present in most patients with pneumonia due to M. pneumoniae (MP). However, severe hemolysis is extremely rare and is usually associated with severe pulmonary involvement. Antibodies (IgM) to the I antigen on erythrocyte membranes appear during the course of infection and produce a cold agglutinin response in approximately 60 percent of patients, which might result in hemolysis and a positive Coombs reaction through activation of complement factor C3d [14, 15,16] These cold agglutinins develop during the second and third week of illness. Although sometimes hemolysis can be severe, it is usually not clinically significant. Our patients had autoimmune hemolytic anemia (AIHA) caused by cold agglutinins as demonstrated by the direct antiglobulin test. The diagnosis of *Mycoplasma pneumoniae infection* was based on elevated cold agglutinins, and serology in the context of a characteristic illness with adequate response to treatment. Other connective tissue disorders and infective causes were excluded. She had a complicated course and needed invasive ventilation, multiple blood transfusions and Hemodialysis. Despite high prevalence the frequency of fulminent pneumonia due to M. pneumoniae complicated by ARDS is reported rarely.(17-24) An important feature in all the studies, including the present one, is that the patients were previously healthy and diagnosed mainly by subsequent serology and outcome of the patients was variable.(17,22,23). Renal involvement in patients with M. pneumoniae pneumonia is rare and limited to few case reports and some have needed Hemodialysis [25–33]. Renal manifestations include progressive glomerulonephritis, nephrotic syndrome, transient, massive proteinuria, chronic renal failure due to cold agglutinin, acute interstitial nephritis, acute renal failure due to acute nephritis, haemoglobinuria or hemolytic uremic syndrome, isolated hematuria, cystitis or urethritis. Glomerulonephritis due to M pneumoniae could be due to an immunological process and can lead to progressive glomerulonephritis. (31) These have been diagnosed as tubulo-interstitial nephritis or proliferative glomerulonephritis. (25-31)

Although we could not demonstrate the pathological changes in the kidneys due, to non availability of a renal biopsy; the renal involvement in our patient seems to be interstitial nephritis. The is evidenced by pyuria with sterile urine, normal complement levels, absence of significant proteinuria and complete recovery of renal function with antibiotics and Hemodialysis support. Most of the reported cases needed Hemodialysis or steroid use to overcome renal failure, but there are reports of renal failure resolved without dialysis or steroid therapy (32). We did use oral steroids upon this patient for her hemolytic anemia that simultaneously took care of her possible interstitial nephritis.

Although, there are reports of some patients with progressive renal failure the prognosis in most of the cases with regard to renal function recovery is probably good.

IV. Conclusion

Although Mycoplasma Pneumoniae infection is usually a benign self-limited disease; this case emphasizes its potential to produce a multiorgan dysfunction. Such complications should be considered and establishing an early diagnosis may have important therapeutic implications. Also, *M. pneumoniae* infections should be included in the differential diagnosis of pathogens presenting with upper respiratory symptoms causing multiorgan dysfunction. Even if only few reports of multi organ dysfunction are reported in infections by Mycoplasma pneumoniae.

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