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Case Report

Chronic Consumption of Alcohol-induced Multiple Organ Dysfunction Syndromes with the Involvement of Five Organ Damages: A Fatal Case Report

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ABSTRACT

Multiple organ dysfunction syndromes are defined as damage to one or more organs and failure of homeostasis between anti-inflammatory and pro-inflammatory reactions. This leads the precipitation and activation of inflammatory cytokines and damages tissues results in MODs. The risk factors includes acute severe pancreatitis, sepsis, shock, stroke and alcohol consumption. These multivariable risk factors may precipitate MOD. We presented 25 years of male patients presented with MOD with a history of excess alcohol consumption and associated acute severe pancreatitis, sepsis and renal failure. The laboratory parameters reveal elevated WBC, neutrophil, bilirubin, AST, ALT, serum amylase and lipase, renal function tests and a significant reduction in lymphocytes and platelets counts. Patients died after the 16th day of treatment due to multiple organ failures. Our study concluded that chronic excessive alcohol consumption may lead to MODS and even rarely death.

Key words: Multiple Organ Dysfunction Syndromes (MODS), Multiple Organ Failure, Acute Severe Pancreatitis, Excess Alcohol Consumption, Fetal Case Report.

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INTRODUCTION

Multiple organ dysfunction syndromes (MODS), even known as multiple system organ failures are characterized as mild to severe or permanent damage of two or more organs rapidly. MODS caused due disruption in the normal function of the organs leads to difficulty or loss in Maintenance of body or organ homeostasis, particularly in a critically ill patient without medical intervention. The incidence rate of MODS is high and varies according to the severity of illness. Comparatively, the incidence rate was higher in the intensive care unit (ICU) among adult patients ranging from 11-14% and the major cause of death about 80% of ICU patients with increased morbidity and mortality.[1,2] The major pathophysiology to induced MODS explains the dysregulation of immune response prone to causes failure to maintain the homeostasis of the organ and leads to activation of anti-inflammatory and pro-inflammatory reactions release cytopathogenic cytokines. These activate massive systemic inflammatory responses that lead to rapid damage of the organs due to ischemia/reperfusion of tissue, hypermetabolism, promote infections, pancreatitis, hepatic gastric impairment.[2-4] The major predisposing factors of MODS included Chronic illness, trauma, stroke, sepsis; severe viral, bacterial and fungal infection, excessive alcohol consumption, drug abuse, inadequate resuscitation and tissue hypoperfusion.[2,3] Chronically, excessive alcohol consumption damages the various organ systems, mostly to the liver, lungs and gastrointestinal tract.[5] As alcohol metabolized by hepatic cells with the help of two major alcohol oxidation enzymes (alcohol dehydrogenize and CYP2E1) but excess alcohol consumption may disrupt with enzymatic function and caused liver damage along with other organs. This may act as a major factor to initiate the progressive damage of other organs. Hence, we are presenting a fatal case of excessive alcohol consumption (history of 2 years of chronic consumption) induced multiple organ dysfunction syndromes with the involvement of five organ damages.

CASE PRESENTATION

A young age 25-year male patient presented with a current history of fever, vomiting and abdominal pain form the past 4 days. He was an unknown history of any chronic illness included diabetes, hypertension, hepatitis, pancreatitis and multiorgan dysfunction syndrome. The patient interview reveals that he has a history of chronic excessive alcohol consumption with the minimal frequency of smoking from the past 2 years. On general examination as shown in Table 1: his blood pressure and body temperature were elevated markedly but mild depression in SPo2. On the abdomen examination, tenderness of the umbilical region was observed but other abdominal parameters were normal. As laboratory parameters are shown in Table 2: initially random blood sugar, neutrophil count, serum amylase, serum lipase, urea and serum creatinine were markedly elevated but haemoglobin, lymphocyte, red blood cells and platelet counts parameters shows minimal declination. An ultrasound of abdomen and pelvis with contrast was performed, showing bulky altered attention in the region of the pancreatic head, diffused hypodense liver parenchyma, bilateral pleural effusion and mild ascites. On differential diagnosis, the initial impression was severe acute pancreatitis with acute kidney disease. On further investigation on the 4th day of symptomatic treatment, the liver function test was done and found nine-fold elevation in bilirubin. Similarly, the renal parameters including urea and creatinine progressively elevated. So, as medical care team interventions, dialysis was done. As days passed, the laboratory parameters including RBS, WBC,

Table 1: Details on day-wise vital signs.

Vital signs	Number of days								
	1	2	3	4	5	6	10	14	16
PR (bpm)	86	88	90	92	92	92	88	90	
BP (mmHg)	140/90	140/80	150/100	140/80	130/80	140/90	140/90	140/100	160/100
Temperature (°F)	102	101	101	99	-	102	-	101	101
SPO_2 (%)	86	86	-	92	92	88	-	84	84

Table 2: Details on day-wise laboratory parameters.

Laboratory parameters	Number of days									
	1	2	3	4	5	6	10	14	16	References
RBS	775	238	224	-	306	315	535	563	635	100-140mg/dl
Hb	12.8	-	-	-	10.6	-	9.8	10.5	10.2	13-18 g/dl
WBC	8400	-	-	-	16800	15000	19700	21400	24700	4-11x10^9/L
N	74	-	-	-	85	-	93	-	98	40-70%
L	10	-	-	-	14	-	7	-	-	20-40%
RBC	3.95	-	-	-	3.30	-	3.09	-	3.02	4.5-5.5X 10^{12} /L
PCV	35.8	-	-	-	31.6	-	29.4	28.7	27.09	40-45%
Platelets	1.29	-	-	-	1.99	1.04	62,000	48,000	36,000	150-450 X 10^9/L
Total Bilirubin	-	-	-	9.1	-	18.2	-	22.6	28.2	0.0-1.2 mg/dl
Direct bilirubin	-	-	-	4.5	-	10.2	-	12.9	16.5	0-0.4 mg/dl
AST	-	-	-	120	-	357	-	57	123	Upto 40 U/L
ALT	-	-	-	84.5	-	170	--	58	110	Upto 40 U/L
Serum Amylase	688	-	-	-	-	93.7	-	-	436.7	20-28 IU/L
Serum Lipase	336	-	-	-	-	68.5	-	-	128.1	13-60 IU/L
Potassium	-	7.6	-	7.5	-	6.3	-	5.6	-	3.5-5.5 mmol/L
Urea	94	169	163	212	-	119.7	-	238	292	15-45 mg/dl
Serum Cr.	4.5	9.1	7.6	9	-	8.5	-	7	13	0.9-1.4mg/dl

PCV, platelets, bilirubin, AST, ALT, serum amylase and lipase, Urea and serum creatinine normal level not able to achieve. The symptoms and laboratory parameters worsen with day increased patient new conditions including systemic sepsis, liver impairment, pancreatitis, kidney failure and breathlessness added. Hence, the final diagnosis made was alcohol-induced multiple organ dysfunction syndromes with the involvement of five organ system damage (Blood, liver, pancreas, kidney and lungs). The symptomatic treatment provided to the presenting condition included IV fluids, methylamine, tramadol, insulin, pantoprazole, ceftriaxone, metronidazole, azithromycin, nebulization, acetaminophen, calcium gluconate, pipercillin+tozabactum, prednisolone and dialysis. Unfortunately, on 16th-day patients died due to respiratory failure. CPR was performed to patients but still, he didn't respond and confirmed as a patient died.

DISCUSSION

Multiple organ dysfunction syndromes may occur due to predisposition if several factors. One of the major risk factors includes pancreatitis and the incidence rate of severe acute pancreatitis induced multiorgan failure ranging from 28 to 76% and the mortality rate 28-69%. Wig Jai Dev *et al*. conducted a retrospective study to correlate, the organ damage associated with severe acute pancreatitis. As a result, it was found that out of 161 patients, 84 (52.2%) patients developed organ failure having a single organ (48.8%), double organ (33.3%) and triple organ (17.9%) damages were observed. Among them, respiratory, renal failure and cardiac failure were most commonly absorbed but fails established a significant association between pancreatitis and organ failure (P=0.109). The most common cause of severe acute toxicity was alcohol consumption.[6] Similarly, in our studies, we found the patient was associated with severe acute pancreatitis with highly elevated serum amylase and lipase level with a history of excessive alcohol consumptions. The chronic pattern of alcohol consumption ranging from 60 to 80 g of alcohol per day for 10-15 years may have a chance to develop clinically significant pancreatitis. But in our patients, pancreatitis was developed within 6 years of excessive alcohol consumptions. As excess alcohol consumption enhances inflammation, fibrosis and calcium deposition in the pancreas may also poor digestion, disrupt hormone production and regulation. This may lead to weight loss, diabetes mellitus and steatorrhea. In this patient, we found patients with uncontrolled glucose levels and unexplained abdominal pain, which may be due to pancreatitis and alcohol consumptions.[7] Similarly, in our case study, we found patients were associated with severe acute pancreatitis with a history of excess alcohol consumption. Excess alcohol consumption also induced inflammation and cause damage at the cellular level. This leads to activation and deficit immune system along with a decline in lymphocytes. This enhances

the chances of bacterial and viral infection and may lead to sepsis. Similarly, in our study, we found decreased lymphocyte count and the patient presented with sepsis.8 Sepsis is also a major cause of multiorgan failure in patients with multiorgan failure. Vincent JL *et al.* conducted a retrospective study to look is severe sepsis can worsen the multiple organ failure. As a result, they included 4,459 patients with severe sepsis in the study. Among them, 1,201 (27.0%) died and 43.1% reason for death was sepsis-associated multiple organ failure. Similarly, in our case, maybe unknown infection may be the reason for the progression of multiple organ damage and death.[9] The sepsis associated with infection of pancreatitis enhances complications and organ failures.[10] In our study, patient's white blood cells and neutrophils increased with the hospital stay and on 17th-day patients got a septic shock, heart failure and kidney failure. This leads to the patient's collapse on the 17th day of treatment.

CONCLUSION

Hence, we conclude that the pattern of excessive alcohol consumption may lead to acute severe pancreatitis and this causes multiple organ failures with various complications like sepsis, diabetes, gastric problems and even death.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

ABBREVIATIONS

MODS: Multiple organ dysfunction syndromes; **ICU:** Intensive care unit; **PR:** Pulse Rate; **BP:** Blood Pressure; **SPO2:** Oxygen saturation; **RBS:** Random Blood Sugar; **RBC:** Red Blood Cells; **HB:** Hemoglobin; **WBC:** White Blood Cells; **PCV:** Packed cell volume; **AST:** Aspartate aminotransferase; **ALT:** Alanine transaminase.

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