

Case Report

Relative polycythemia in acute pancreatitis: a series of case report

Shruthikamal Venkat, Reshma Sattar*, Rajesh Subramaniam, Dinesh Kumar

Department of General Surgery, Saveetha Medical College, Chennai, Tamil Nadu, India

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***Correspondence:**

Dr. Reshma Sattar,

E-mail: dr.reshma101167@gmail.com

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ABSTRACT

Polycythemia is an unusual manifestation of acute pancreatitis. When polycythemia does occur, it is almost invariably due to intravascular fluid depletion, contraction of Plasma volume, Gaisbock's Syndrome, Primary congenital and familial polycythemia, polycythemia vera, Hypoxia as in high altitude, pulmonary cyanotic congenital heart diseases, hypoventilation syndromes like sleep apnea, Smoker's Polycythemia, carbonmonoxide intoxication caused by industrial exposure, Erythropoietin secreting tumors, post renal transplantation erythrocytosis and congenital polycythemias. This case series report presents four patients with acute pancreatitis and relative polycythemia due to reduction in plasma volume as a result of intravascular volume depletion, as demonstrated by Haemoglobin and Hematocrit during acute pancreatitis and the significance of this association is discussed. Among the case series, the case 1 was relative polycythemia with acute pancreatitis presented as pseudocyst, whereas the case 2, 3 and 4 presented as relative polycythemia with necrotizing pancreatitis. The clinical course of the patient suggested that the relative polycythemia developed subsequent to the clinical onset of acute pancreatitis. It is believed that this represents the first recorded case series in the English Literature of acute pancreatitis with Relative Polycythemia due to reduction in plasma volume as a result of intravascular volume depletion. Four Patients presented with Relative polycythemia during acute pancreatitis was found.

Keywords: Relative polycythemia, Acute pancreatitis, Pseudocyst of pancreas, Hematocrit

INTRODUCTION

Polycythemia is an unusual manifestation of acute pancreatitis. When polycythemia does occur, it is almost invariably due to intravascular fluid depletion, contraction of Plasma volume, Gaisbock's Syndrome, Primary congenital and familial polycythemia, polycythemia vera, Hypoxia as in high altitude, pulmonary cyanotic congenital heart diseases, hypoventilation syndromes like sleep apnea, Smoker's Polycythemia, carbonmonoxide intoxication caused by industrial exposure, Erythropoietin secreting tumors, post renal transplantation erythrocytosis and congenital polycythemias.

This Case series report presents four patients with acute pancreatitis and relative polycythemia due to reduction in plasma volume as a result of intravascular volume

depletion. Four patients presented with Relative Polycythemia as demonstrated by Haemoglobin and Hematocrit during acute pancreatitis and the significance of this association is discussed.

CASE REPORT

Case 1

A 27 years old male an alcoholic and a smoker were admitted for epigastric pain radiating to the back, for two day's duration. Patient gave previous episode of severe epigastric pain, nausea and vomiting and undergone treatment for acute pancreatitis 2 months ago before visiting our hospital. His previous clinical reports showed the following parameters. Haemoglobin-21.1g/dl (normal range 13.5-17.5g/dl), Hematocrit-63.8% (normal range 38.8-50 %),CT (Computed Tomography) contrast

abdomen showed pseudocyst of size 1.3x2.1 cm on body and 3.5x3.1cm in tail of pancreas. Physical examination revealed an acutely ill man, with blood pressure of 130/80/mm Hg, pulse rate 90 beats/ min and regular, temperature of 99.2F (37.3 C). Pertinent findings included left side rales, there was vague fullness at left hypochondrium, tenderness in the epigastrium, bowel

sounds were hypoactive, Laboratory data are showed in the (Table 1) for this and subsequent cases. Haemoglobin measured was 19.5 g/dl (normal range 13.5-17.5 g/dl), Hematocrit measured was 53.2% (normal range 38.8-50%) done on first day of admission during acute pancreatitis revealed polycythemia.

Table 1: Relative polycythemias in acute pancreatitis. Lab parameters.

Lab parameters	Case 1		Case 2		Case 3		Case 4	
	Admission	Day 5	Admission	Day 5	Admission	Day 5	Admission	Day 5
Hemoglobin (g/dl)	19.5	15	20	13.1	20.1	15.3	21.5	14.5
Hematocrit (%)	52.2	45	51.7	40.1	57	44.4	69.4	50
Serum Amylase <100 µ/l	153		1050		369		369	
Serum Lipase <64µ/l	494		1203		704		193	

On admission, it was felt that the patient’s elevated Haemoglobin and Hematocrit was probably related to blood disorder and he was investigated for polycythemia. Serum erythropoietin measured by chemiluminescent immunometric assay was 14.20 mIU/ml (normal range 4.30-29.00 mIU/ml), Jak 2 mutation analysis (V617F) measured by Real Time Polymerase Chain Reaction (RT-PCR) was negative. ECHO (was normal, Pulmonary function test was normal. Chest X-ray revealed left pleural effusion.

Patient was treated for acute pancreatitis and he was doing well. A Repeat Haemoglobin and Hematocrit was taken after five days which later showed normal range (i.e. Haemoglobin was 15 g/dl (normal range 13.5-17.5g/dl), Hematocrit was 45% (normal range 38.8 to 50%) Relative Polycythemia was diagnosed along with Acute Pancreatitis. Patient was treated conservatively, advised modification of life style, explained about the risks of persistent polycythemia like thromboembolism. Patient is on regular follow-up. During his regular followup visits, showed good resolution of pseudocyst.



Figure 1: Contrast CT Abdomen showing pseudocyst of pancreas (case 1).

Patient was treated with somatostatin analogue, proton pump inhibitors and Analgesics and hydrated with IV fluids. His serum lipase was 494µ/l (normal range <64µ/l) and serum amylase was 153µ/l (normal range <100µ/l). Contrast CT abdomen revealed, Figure 1 Acute Pancreatitis with pseudocyst formation with cystic lesion in the tail of pancreas measuring 4.3x3.5cm, another cystic lesion in the body of pancreas measuring 1.5x1.1 cm, rest of abdomen was normal except for mild ascites and left minimal pleural effusion, which confirmed the impression of acute pancreatitis.

Case 2

A 30 years old male an alcoholic and smoker for many years presented with severe pain epigastrium and four episodes of vomiting. Examination revealed an acutely ill man with a tachycardia of 96 beats/min and a temperature of 101 F (38°C). There was tenderness in the epigastrium. Bowel sounds were hypoactive. Patient was investigated and his laboratory data showed, (Table 1) Haemoglobin-20 g/dl (normal range- 13.5 to 17.5 g/dl) Hematocrit-51.7% (normal range- 38.8 to 50%). He was investigated for polycythemia serum erythropoietin measured by chemiluminescent immunometric assay was 21 mIU/ml (normal range- 4.30-29.00 mIU/ml), JAK 2 mutation Analysis (V617F) measured by Real Time Polymerase Chain Reaction (RT-PCR) was negative. ECHO showed normal Study, Chest X-ray revealed left pleural effusion, Pulmonary Function Test normal. Patient was treated for acute pancreatitis. His Serum Lipase was 1203 µ/l (normal range- <64 µ/l) Serum Amylase was 1050 µ/l (normal range <100 µ/l). CECT abdomen revealed, Figure 2 Acute necrotizing pancreatitis with CT Severity index-8. Mild ascites and left minimal pleural effusion. Acute pancreatitis with Relative Polycythemia was diagnosed. A Repeat Haemoglobin and Hematocrit done after 5 days showed normal range. Haemoglobin was 13.1g/dl (normal range 13.5 to 17.5 g/dl). Hematocrit was

40.1% (normal range 38.8 to 50%). Patient is on regular follow-up. During his regular follow-up Visits, his health condition improved.



Figure 2: Contrast CT abdomen showing acute necrotizing pancreatitis (case 2).

Case 3

A 38 years old man was admitted with pain in the epigastric region associated with 3 episodes of vomiting. The patient was well until two months prior to admission when he noted the onset of fever and dull persistent non colicky pain in the epigastrium. Patient gave previous recurrent episodes of abdominal pain associated with alcohol ingestion. A diagnosis of acute pancreatitis was made at the hospital. Patient was examined and there was dullness and diminished breath sounds over the left lower lung field posteriorly. Abdomen was slightly tense with epigastric tenderness Chest X-ray film revealed a left pleural effusion, and his laboratory data showed, Haemoglobin-20.1 (normal range 13.5-17.5 g/dl) Hematocrit-57% (normal range 38.8-50%). In view with elevated Haemoglobin and Hematocrit levels patient was investigated for polycythemia Serum erythropoietin measured by chemiluminescent immunometric assay was 8.41 mIU/ml (4.30-29.00 mIU/ml), JAK 2 mutation analysis (V617 F) measured by Real Time Polymerase Chain Reaction (RT-PCR) was negative, ECHO was normal. Pulmonary function test was normal. Patient was treated for acute pancreatitis Hydrated well with intravenous fluids. His serum lipase was 704 μ /l (normal range - <64 μ /l). Serum Amylase was 369 μ /l (normal range - <100 μ /l). Contrast CT Abdomen revealed, Acute necrotizing pancreatitis, Bilateral Pleural effusion (left >Right) with passive collapse of bilateral lung fields with CT severity index 8/10. Acute Pancreatitis with Relative Polycythemia was diagnosed. A Repeat Haemoglobin and Hematocrit done 5 days later showed normal range. Haemoglobin was 15.3 g/dl (normal range - 13.5 to 17.5 g/dl) Hematocrit was 44.4% (normal range- 38.8 to 50%) Patient is on regular follow-up, during his regular follow-up Visits, his health condition improved.

Case 4

A 38 years old male alcoholic was admitted with epigastric pain with 5 episodes of vomiting for 1 day duration. On examination, the patient's temperature was 101.4 F (38.6 C), pulse rate 102 beats /min and regular and his blood pressure, 130/80 mm Hg. There was tenderness in the epigastrium on palpation. The Bowel sounds were absent. Patient was felt to have acute pancreatitis; His laboratory data showed, Haemoglobin 21.5 g/dl (normal range 13-17 g/dl) Hematocrit measured was 69.4% (normal range 40 to 50%). In view with elevated Haemoglobin and Hematocrit levels, Patient was investigated for polycythemia. Serum erythropoietin measured by chemiluminescent immunometric assay was 15.10 mIU/ml (4.30-29.00) JAK 2 mutation analysis (V617F) measured by Real Time Polymerase Chain Reaction (RT-PCR) was negative. Patient was treated for acute pancreatitis initially with nasogastric suction, intravenous fluids and somatostatin analogue. His serum lipase was 193 μ /l (normal range- <64 μ /l), serum Amylase was 369 μ /l (normal range- <100 μ /l). Contrast CT abdomen revealed, Acute Pancreatitis with ill-defined hypodense foci likely representing necrosis/edema, in the body with extensive peripancreatic fat stranding, minimal ascites, bilateral minimal pleural effusion (extra pancreatic Complication), with CT severity index of 6- suggestive of moderate to severe Pancreatitis.¹

Acute pancreatitis with Relative Polycythemia was diagnosed. A Repeat Haemoglobin and Hematocrit done 5 days later showed normal range Haemoglobin was 14.5 g/dl (normal range 13.5 to 17.5 g/dl), Hematocrit was 50% (normal range 38.8 to 50%) patient is on regular-follow-up, During his regular follow-up visits, his health condition improved.

DISCUSSION

Acute pancreatitis is typically characterized by abdominal pain located in the epigastric or supraumbilical regions, often radiating to the mid- thoracic portion of the back. Pain usually reaches maximum intensity within 20 minutes but may have a more gradual onset. The pain from Acute pancreatitis is usually sharp, constant, lasts hours to days, and is severe enough to force the patient to visit the emergency room. Nausea and vomiting with or without low-grade fever are the most commonly associated symptoms.²⁻⁵

A recent history of binge drinking may be frequently elicited in patients with alcohol-induced pancreatitis.

The usual findings on a physical examination are abdominal distension, tenderness, guarding and absent bowel sounds. Fever associated with acute pancreatitis is generally low grade. High-grade temperature may indicate development of infected pancreatic necrosis and associated fluid collection or cholangitis, particularly if Jaundice is present.²⁻⁵ Tachypnea and dyspnea are also

common in severe pancreatitis, owing to splinting from the sub diaphragmatic inflammatory process, associated pleural effusions. Pleural effusions are mainly found on the left side but can be bilateral.

Pancreatic pseudocysts occur in 2-10% of patients with mild and in approximately 50% of patients with severe acute pancreatitis.⁶

Severe Acute pancreatitis causes massive loss of fluid in to the retroperitoneal spaces. As a result, there is tachycardia, which is some earliest clues for a moderate to severe attack of Pancreatitis, and these are the markers for significant early depletion of intravascular volume. These may soon progress to hypovolemic shock caused by increased vascular permeability, vasodilatation and haemorrhage.¹ Relative polycythemia can occur when the plasma volume is reduced as a result of intravascular volume depletion. This is the reason for relative polycythemia during acute pancreatitis.

Relative polycythemia is a term used to describe an elevation of the hematocrit level either caused by an acute transient state of hemoconcentration associated with intravascular fluid depletion or a chronic sustained relative polycythemia caused by contraction of the plasma volume. These can be corrected by appropriate replacement of intravascular fluids. Primary significance of investigations and management of patient with Relative Polycythemia during acute pancreatitis is to avoid thrombo-vascular complications like portal, hepatic and mesenteric vein thrombosis associated with this disease.⁷ Treatment is correction of underlying risk factors.

CONCLUSION

A case of acute pancreatitis with relative polycythemia due to reduction in plasma volume as a result of intravascular volume depletion. The clinical course of the patient suggested that the relative polycythemia developed subsequent to the clinical onset of acute pancreatitis. Four Patients presented with Relative polycythemia during acute pancreatitis was found.

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