



RESEARCH ARTICLE

Post pancreatitis fluid collection, management and sequel.

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Abstract

A cross sectional comparative analytical study in prospective pattern had been carried out in Gastroenterology and Hepatology teaching hospital and medical city/ Baghdad/ Iraq. The data collection phase extend over a period of 26 months from 1/1/2016 to 28/2/2018, it includes the attendants to Gastroenterology and Hepatology teaching hospital with acute pancreatitis (Acute interstitial and acute necrotizing pancreatitis), SPSS version 23 was used for statistical analysis, A p-value < 0.05 was considered statistically significant. This study including 33 cases of different types of acute pancreatitis complications, with mean age of 37 ± 12 years old age, nearly equal gender distribution, 6 case are APPFCs all of them treated conservatively; 17 cases are pseudocysts in which 2 of them treated endoscopically, 5 cases treated conservatively, and 10 cases treated surgically; 4 cases are ANCs in which 2 of them treated conservatively and other 2 treated surgically; 6 cases are WON in which all of them treated surgically.

Keywords: Acute pancreatitis, acute peripancreatic fluid collections, acute necrotic collections, walled off necrosis, Pseudocyst, Revised Atlanta classification.

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1 | INTRODUCTION

Acute pancreatitis (AP) is due to acute inflammation of the exocrine pancreas due to the inappropriate intra-parenchymal activation of digestive enzymes⁽¹⁾. The principal etiological factors in most demographic settings are gallstones and alcohol⁽²⁾. In clinical terms, it is characterized by a rapid onset of typical epigastric pain in con-

junction with elevated serum lipase and/or consistent appearances on medical imaging⁽³⁾. Chronic pancreatitis (CP), by contrast, involves a chronic inflammatory process with a variable but progressive course of fibrosis and loss of parenchyma⁽¹⁾. The basic pathogenic mechanism is considered to be the cumulative effect of successive acute insults, or the so-called necrosis-fibrosis sequence, on a background of oxidative stress⁽⁴⁾. In the Western world, the prin-

cial causative factor is alcohol⁽¹⁾, although various other effect modifiers such as smoking^(5,6), diet^(7,8) and genetic predisposition^(9–11) are thought to play a part in its multifactorial etiology. Clinical manifestations of chronic pancreatitis, which are variable in extent and time-course, are pain, malabsorption and diabetes. Chronic pancreatitis is also associated with an increased risk of pancreatic cancer^(12,13). Drugs appear to cause less than 5% of all cases of acute pancreatitis. The drugs most strongly associated with the disorder are azathioprine, 6-mercaptopurine, angiotensin-converting-enzyme inhibitors, and mesalamine^(14,15). Mutations and polymorphisms in a number of genes are associated with acute (and chronic) pancreatitis, including mutations in the genes encoding cationic trypsinogen (PRSS1), serine protease inhibitor Kazal type 1 (SPINK1) and cystic fibrosis transmembrane conductance regulator (CFTR)⁽¹⁶⁾. The cause of acute pancreatitis often cannot be established, and the proportion of persons who are considered to have idiopathic acute pancreatitis increases with age. Morbid obesity is a risk factor for acute pancreatitis^(18,19) and for severe acute pancreatitis.⁽²⁰⁾ Type 2 diabetes increases the risk of acute pancreatitis by a factor of 2 or 3⁽¹⁸⁾. Both obesity and diabetes are also risk factors for chronic pancreatitis and pancreatic cancer.⁽²¹⁾ The management and study of acute pancreatitis was hindered by confusing and occasionally conflicting terminology⁽²²⁾. In 1992, a consortium of acute pancreatitis experts developed the Atlanta Classification, the only widely accepted clinically based classification system used by clinicians and radiologists^(22,23). This initial Atlanta classification system represented major progress, but advancing knowledge of the disease process, improved imaging, and ever-changing treatment options such as minimally invasive radiologic, endoscopic, and laparoscopic procedures soon rendered some of the definitions inadequate or ambiguous^(33,34), presenting a need to revise and update the Atlanta classification⁽³⁵⁾. It was found that the definitions of severity and local complications of acute pancreatitis were not used consistently and that characterization of severity based on presence of organ failure had limitations^(33,34). The definition of necrotizing pancreatitis was determined to be inadequate because it included sterile and infected

necrosis and did not distinguish between pancreatic and peripancreatic necrosis⁽³³⁾. In response, the Atlanta Classification underwent revision in 2012⁽²⁴⁾ to incorporate the latest understanding of the disease. The 2012 revision requires at least two of the following three criteria for diagnosis: abdominal pain consistent with the disease, a threefold increase in serum amylase or lipase levels, and imaging findings consistent with acute pancreatitis^(24,25). As such, acute pancreatitis is mainly a clinical diagnosis, and imaging should be reserved for ambiguous cases, when the patient fails to improve clinically within the first 48–72 hours after admission, to evaluate suspected complications⁽²⁵⁾, or for elucidating the underlying cause. The development of pancreatic fluid collections (PFCs) is a common complication of severe acute pancreatitis. The revised Atlanta classification categorizes PFC into four sub-types: acute peripancreatic fluid collections (APFC), acute necrotic collections (ANC), pseudocysts and walled off necrosis (WON)⁽³⁷⁾. The differentiation of these collections is mainly based on the duration (< or > 4 wk.) and nature of collections (necrotic or non-necrotic). APFC (\leq 4 wk.) develop after an episode of interstitial edematous pancreatitis (IEP) and may evolve into pseudocyst after 4 wk., whereas ANC (\leq 4 wk.) develop after acute necrotizing pancreatitis and subsequently transform into WON after 4 wk. By definition, pseudocysts have clear contents and WON have variable amount of solid necrotic debris⁽³⁵⁾. The distinction between two types of acute pancreatitis—interstitial edematous pancreatitis and necrotizing

pancreatitis—was retained, but pancreatic and peripancreatic collections were redesigned by revised Atlanta classification and the previously used terms such as pancreatic abscess and pancreatic phlegmon were abolished. Disease severity is stratified by organ failure, local complications (fluid collections

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and necrosis), and systemic complications⁽²⁴⁾. Three organ systems should be assessed to define organ failure: respiratory, cardiovascular and renal. Organ failure is defined as a score of 2 or more for one of these three organ systems using the modified Marshall scoring system⁽³⁷⁾. Traditionally, Ranson's, Glasgow or APACHE –II scoring systems have been used for severity stratification. These scoring systems require multiple clinical parameters and set of laboratory investigations to be carried out which may or may not be possible at every institutional setup and require minimum 48 hours for calculation⁽³⁰⁾.

2 | AIM OF THE STUDY

To provide an objective options for the management of different types of post pancreatitis fluid collection as proposed by revised Atlanta classification

3 | PATIENTS AND METHODS

A cross sectional comparative analytical study in prospective pattern had been carried out in Gastroenterology and Hepatology teaching hospital/ Baghdad/ Iraq. The data collection phase extend over a period of 26 months from 1/1/2016 to 28/2/2018 on a 33 participants . Statistical Package for Social Sciences (SPSS) version 24 had been used for data analysis.. t test , ANOVA test had been used for analysis of quantitative variables, analysis were performed to recognize the independent predictors of complication. A p-value < 0.05 was considered statistically significant.

4 | RESULTS

A cross-sectional study including 33 cases of different types of acute pancreatitis complications, with mean age of 37±12 years old age, nearly equal gender distribution, study their character according to preoperative investigations.

Table 1: Relationship between patient demography and types of pancreatitis complication

	Complication (No. %)				Total	Fissur eexact , P valu
	APFFC	pseud ocyst	ANC	walled fncrosis		
Age						
15-30	0, (0.0%)	6, (35.3 %)	2, (50 %)	2, (33.3%)	10	5.212
30-44	4, (66.7 %)	5, (29.4 %)	1, (25 %)	3, (50 %)	13	.549
≥ 45	2, (33.3%)	6, (35.3 %)	1, (25 %)	1, (16.7%)	10	
Sex						
Male	2, (33.3%)	11, (64.8%)	0, (0.0%)	3, (50 %)	17	7.228,
Female	4, (66.7%)	6, (35.2 %)	4, (100%)	3, (50 %)	16	.060
BMI						
Normal	4, (66.7%)	7, (41.2%)	3, (75 %)	2, (33.3%)	16	4.977,
Over weight	1, (16.6%)	9, (53 %)	1, (25 %)	3, (50 %)	14	0.527
Sever obesity	1, (16.6%)	1, (5.8 %)	0, (0 %)	1, (16.7%)	3	
Total	6, (100 %)	17, (100%)	4, (100 %)	6, (100 %)	33	

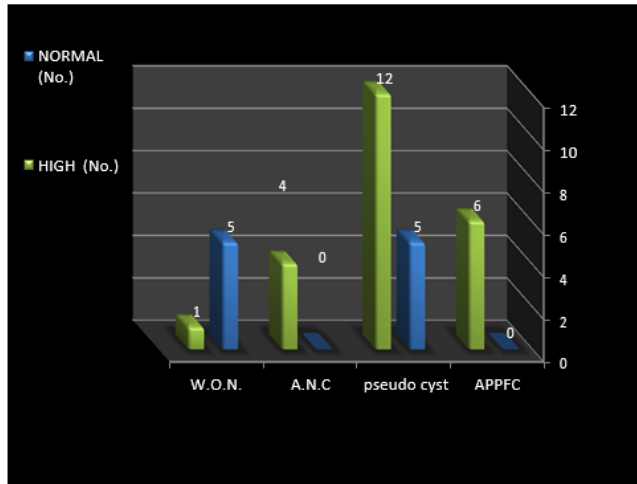
There was no significant statistical association between demographic characters of the patient with the types of complications .

Table 2: Complications of acute pancreatitis according to the patients WBC, Calcium Selected liver function test

COMPLICATION					Total 33	Fissure exact test
	APFFC No.(6)	pseudo cyst No.(17)	Acute necrotic collection No.(4)	walled of necrosis No.(6)		P value
WBC						
Normal	0, (0 %)	9, (53%)	0 (0 %)	2, (33.3%)	11	48.3,0.036
leukocytosis	6, (100 %)	8, (47 %)	4, (100 %)	4, (66.7%)	22	
TSB						
Normal	6, (100 %)	14, (82.3%)	2, (50 %)	5, (83.3%)	27	8.844 0.018
High	0, (0 %)	3, (17.7%)	2, (50 %)	1, (16.7%)	6	
ALP						
Normal	6, (100 %)	12, (70.6%)	4, (100 %)	6, (100 %)	28	1.490 0.999
High	0, (0 %)	5, (29.4 %)	0, (0 %)	0, (0 %)	5	
ALT						
Normal	6, (100 %)	11, (64.7%)	2, (50 %)	6, (100%)	25	2.088 0.695
High	0, (0 %)	6, (35.3%)	2, (50 %)	0, (0 %)	8	
AST						
Normal	6, (100 %)	9, (53 %)	2, (50 %)	6, (28.3%)	23	2.086 0.684
High	0, (0 %)	8, (47 %)	2, (50 %)	0, (0 %)	10	
Calcium						
Normal	6, (100%)	14, (82.4 %)	2, (50 %)	5, (83.3 %)	27	
Low	0, (0 %)	3, (17.6%)	2, (50 %)	1, (16.7 %)	6	
Total	6, (100 %)	17, (100 %)	4 (100 %)	6 (100 %)	33	

Different levels of TSB and WBC had been shown to be statistically associated with types of compli-

cations. There was no significant statistical association between different levels of liver enzymes and calcium with the types of complications. Figure one show all the cases of ANC and APPFC were with high amylase level, while most of the pseudocysts cases were with elevated amylase level.



F.E= 5.854, 0.013

FIGURE 1: Complications according to Amylase level

Table (3) complications according to the disease etiology

Etiology	COMPLICATION:				Total	F.E. value
	APFC	Pseudo cyst	Acute necrotic collection	walled of necrosis		
Gallstone	3, (50 %)	10, (58.9%)	4, (100 %)	5, (83.3%)	22	11.380 .028
idiopathic	2, (33.3 %)	1, (5.9%)	0, (0%)	1, (16.7%)	4	
Alcoholic	0, (0 %)	3, (17.6%)	0, (0%)	0, (0%)	3	
trauma	0, (0 %)	3, (17.6%)	0, (0%)	0, (0%)	3	
Postoperative	1, (16.7%)	0, (0 %)	0, (0%)	0, (0%)	1	
Total	6, (100 %)	17, (100%)	4, (100 %)	6, (100%)	33	

This table shows that gallstones have more tendency to cause necrotizing pancreatitis which leads to increase incidence of ANC and WON among gallstone pancreatitis. There was significant statistical association between the causes of pancreatitis and different types of complications.

In comparison to APPFCs, 50 % of ANCs required some sort of surgical intervention, while all cases of APPFCs treated conservatively. Moreover, all cases of WONs required surgical intervention while about

30% of pseudocysts treated conservatively and not required any surgical intervention. This support the theory that more sever form of pancreatitis requires more surgical intervention.

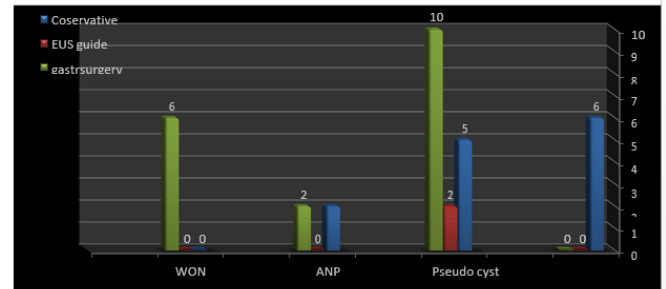


FIGURE 2: Management of the complication.

Table (4): Association of levels of amylase with different types of complications

Amylase	COMPLICATION				Total	F.E.P
	APPFC	pseudo cyst	Acute necrotic collection	walled of necrosis		
Normal	0, (0 %)	5, (29.5%)	0, (0 %)	5, (83.3%)	12	5.858 0.013
High	6, (100%)	12, (70.5%)	4, (100 %)	1, (16.7%)	23	
Total	6, (100%)	17, (100%)	4, (100%)	6, (100%)	33	

This table showed that all cases of APFCs and ANCs have elevated amylase level in comparison to pseudocyst and WON, this support the theory that amylase level returns to normal after several days of acute attack .There was significant statistical association between level of amylase and the type of complications.

5 | DISCUSSION

Atlanta classification subcategorize the post pancreatic fluid collection into 4 subgroups depending on the results of radiology and timing from onset of pancreatitis. Our studied patient are divided as the following:

1. Acute peripancreatic fluid collection: 6 cases.
2. Acute necrotic collection: 4 cases.
3. pseudocyst: 17 cases.

4. Walled off necrosis: 6 cases.

The highest **age specific prevalence** was among the age of (30-44) years. Pseudocyst cases show no significant differences in the different age category, while the ANC concentrated at age (15-30) years, these results show a little difference from other studies, where the presenting age was slightly earlier than our studied population^(12,24,32) which may be related to the etiological factors of the occurrence of the illness.

Regarding sex difference in different subgroups, there was highest rate of female representativeness among APPFC and ANC, while male were higher among pseudocyst, These results show no difference from other studies.⁽²³⁾

Regarding BMI difference in different subgroups, there was highest rate of normal body weight representativeness among APPFC and ANC, while overweight were higher among pseudocyst and WON, these results show a little difference from other studies (Morbid obesity is a risk factor for acute pancreatitis)⁽¹⁹⁾.

Regarding LFT : we found 1/6 of the Pseudocyst and WON were with high TSB , and the liver enzymes were elevated in significant proportions of pseudocyst and ANC.. This is comparable to other studies⁽²⁸⁾

Amylase level: there was a significant increase in amylase level in APPFCs and ANCs if compared with pseudocysts and WONs, and this goes with the concept that amylase level decrease or return to normal level in late state of pancreatitis, and this was comparable with other studies ^(24,25,32)

Etiology: Most of the cases were with gall stones, followed by idiopathic, while alcohol and trauma share the same proportion and only one case was due to post-operative complications. In this study the most common cause of acute pancreatitis was G.S (66.6%), while alcohol causing only (9%), This was differ from other American study in New York medical college conducted by Lowenfels AB, Maisonneuve P, and Sullivan T et al, in which the percentage of GS was 40-70%, while alcohol 25-35%, this might be due to the socio-demographic character of population ⁽³¹⁾.

Regarding the management: in our study all the cases of acute peripancreatic fluid collections are treated conservatively and none of them need surgical intervention and no progression to pseudocyst. This is probably due to the small number of APPFCs in this study . All the cases resolved without any deterioration or development of further complications and no one of them required readmission, this is comparable to other studies conducted by Dr. Vikas and Dr. Henry Knipe et al. ^(24,32,33). In this study we have 17 cases of pseudocysts, of which 16 patients required admission because of severe symptoms or complications and only 1 patient treated as an outpatient. Six of these patients are treated conservatively by supportive care and discharge well but 2 of them readmitted because of development of complications (GOO and jaundice) in which surgical cystgastrostomy done for them and discharged after about 1 week. The other 4 patients that are treated conservatively inpatient and the one who treated as an outpatient did well so the total No. of patient with pseudocysts that are treated conservatively is 5. Eight patient presented with severe symptoms and/or complication for which surgical drainage performed during the same hospital admission after a short period of supportive care, the type of surgery was open surgical cystgastrostomy. The remaining 2 cases are treated by endoscopic EUS guided cystgastrostomy.

In our study about 30% of pseudocyst disappeared completely while in other study conducted by Cui et al studying the clinical course of fluid collection in acute pancreatitis he found that about 25% disappear completely ⁽³⁴⁾. Regarding the treatment of acute necrotic collection, In our study we have 4 cases of ANC all of them admitted to the hospital, 50 % of the cases only required intervention.

Regarding walled off necrosis , In this study we have 6 cases of WON all of them need admission and treated conservatively in other study 50% required an intervention, this is because the referral cases of WON was sever that not treated by conservative treatment⁽³⁵⁾.

6 | CONCLUSIONS

Fluid collection is common after pancreatitis and it is important to classify PFCs to guide management. The revised Atlanta classification divided the PFCs into early and late. In this study all the cases of APFCs are treated conservatively, while surgical intervention is needed in 2 cases of ANCs, 10 of 17 cases of pseudocyst, and all the cases of WONs. Although the minimally invasive procedures are increasingly used nowadays, open surgical intervention is widely used in our center.

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