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ORIGINAL ARTICLE

Comparison of the imaging and clinical characteristics between Initial and Recurrent Alcoholic Acute Pancreatitis: a retrospective cross-sectional study

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ABSTRACT

Background: Patients with a first episode of Alcoholic Acute Pancreatitis (AAP) may experience Recurrent Alcoholic Acute Pancreatitis (RAAP). However, few reports have focused on RAAP imaging characteristics.

Objectives: The aim of this study was to compare the imaging and clinical characteristics between Initial Alcoholic Acute Pancreatitis (IAAP) and RAAP.

Materials: Patients with alcoholic acute pancreatitis in our hospital were recruited from Jan 2019 to July 2022 and divided into IAAP and RAAP groups. All patients underwent Contrast-Enhanced Computerized Tomography (CECT) or Magnetic Resonance Imaging (MRI) after administration. Imaging manifestations, local complications, severity scores on the Modified CT/MR Severity Index (MCTSI/MMRSI), Extrapancreatic Inflammation on CT/MR (EPIC/M), clinical severity [Bedside Index for Severity in Acute Pancreatitis (BISAP) Acute Physiology and Chronic Health Evaluation (APACHE-II)], and clinical prognosis were compared between the two groups.

Results: 166 patients were recruited for this study, including 134 IAAP (male sex 94%) and 32 RAAP patients (male sex 100%). On CECT or MRI, IAAP patients were more likely to develop ascites and Acute Necrosis collection (ANC) than RAAP patients (ascites:87.3%vs56.2%; $P = .01$; ANC:38% vs18.7%; $P < .05$). MCTSI/MMRSI and EPIC/M scores were higher in IAAP than in RAAP patients (MCTSI/MMRSI:6.2vs5.2; $P < .05$; EPIC/M:5.4vs3.8; $P < .05$).Clinical severity scores (APACHE-II and BISAP), length of stay, and systemic complications [Systemic Inflammatory Response Syndrome (SIRS), respiratory failure] were higher in the IAAP group than in the RAAP group ($P < .05$). No mortality outcomes were reported in either group while hospitalized.

Conclusions: Patients with IAAP had more severe disease than those with RAAP. These results may be helpful for differentiating care paths for IAAP and RAAP, which are essential for management and timely treatment in clinical practice.

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Acute pancreatitis; recurrent acute pancreatitis; alcohol; CECT; MR

Introduction

Acute Pancreatitis (AP) is a common acute abdominal condition, the incidence of which has been increasing annually over the past 20 years (1,2). Most cases are mildly self-limiting Most cases are mildly self-limiting (3). However, approximately 17–29% of AP (4,5) patients may develop Recurrent Acute Pancreatitis (RAP). RAP is strongly associated with alcohol and local complications (4–7).

Alcohol is the second leading cause of AP following gallstones (8). Alcoholic Acute Pancreatitis (AAP) patients are more likely to be readmitted to the hospital (4,5) with a severe impact on their quality of life (9). A Dutch follow-up study of 669 patients with AP showed that 117 (17%) developed RAP, including 24% of patients with alcoholism and only 12% of patients with biliary disease (4). Furthermore, a study showed that alcohol was the primary cause in approximately 71.4% of 1666 AP patients. A total of 43.5% of patients with AAP were readmitted for relapse, compared to 22.1% of patients with non-AAP (10). Therefore, RAP occurs primarily in AAP rather than acute biliary pancreatitis, and AAP episodes may increase the risk of future RAP (10,11). Many clinical studies have described risk factors, complications, and prognosis (e.g., mortality) associated with AAP and RAP (4,5,7,12), while few have focused on Recurrent Alcoholic Acute Pancreatitis (RAAP) imaging characteristics. Imaging studies, including Contrast-Enhanced Computerized Tomography (CECT) and Magnetic Resonance Imaging (MRI), are the major methods for assessing the severity and complications of AP (13). However, the current literature poorly

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addresses the differences in imaging and clinical features between Initial Alcoholic Acute Pancreatitis (IAAP) and Recurrent RAAP. An accurate understanding of RAAP clinical outcomes and imaging (CECT/MRI) characteristics is important for clinical resource allocation.

Therefore, the main objectives of this study were to (1) evaluate the imaging (CECT/MRI) characteristics of IAAP and RAAP, (2) evaluate the clinical characteristics of IAAP and RAAP, and (3) analyze the differences in the above characteristics between IAAP and RAAP.

Materials and methods

Patients

This study was a single-center retrospective cohort study approved by our Institutional Review Board. Informed consent exemptions were granted for the study because of its retrospective nature.

AP patients were admitted to our hospital from January 2019 to July 2022. Based on the 2012 Revised Atlanta Classification (2012 RAC) (14), AP diagnosis met two of the following three criteria: (1) abdominal pain, (2) serum lipase and amylase levels exceeding the standard upper limit by a factor of three, and (3) imaging performance consistent with AP characteristic changes. RAP was defined as follows (15): (1) patients with a diagnosis of AP, at least 3 months of an interictal period since the last AP attack, complete or almost completely normal symptoms, and (2) no chronic pancreatitis.

IAAP inclusion criteria (10,16) were as follows: (1) patients with a diagnosis of AP, (2) patients admitted to the hospital at the first episode, (3) patients with reports of heavy and/or long-term alcohol misuse (>40 g per day, >5 years) before the onset of the disease, (4) patients who underwent CT and/MRI upon hospitalization, and (5) patients with complete medical records. RAAP inclusion criteria were as follows: (1) patients with a diagnosis of RAP, (2) history of alcohol use consistent with AAP diagnosis, (3) patients who underwent CECT and/or MRI upon hospitalization, and (4) patients with complete medical records.

The exclusion criteria in this study were as follows: (1) patients with 5+ years of sobriety or no history of heavy or long-term alcohol misuse before onset, (2) patients with other causes, such as gallbladder stones, pancreatic cancer, viral infection, abdominal trauma, recent endoscopic retrograde cholangiography, metabolic disorders, hereditary diseases, and drug side effects, (3) patients with chronic pancreatitis, and (4) patients with incomplete medical records.

A total of 166 patients with AAP, specifically 134 patients(male sex 94%)with IAAP and 32 patients with RAAP (male sex 100%), were included according to the inclusion and exclusion criteria, as shown in Figure 1. While 25 patients (25/166 15.1%)with IAAP and 8 patients (8/166 4.2%) with RAAP met the diagnostic criteria of both AAP and hyperlipidemic pancreatitis

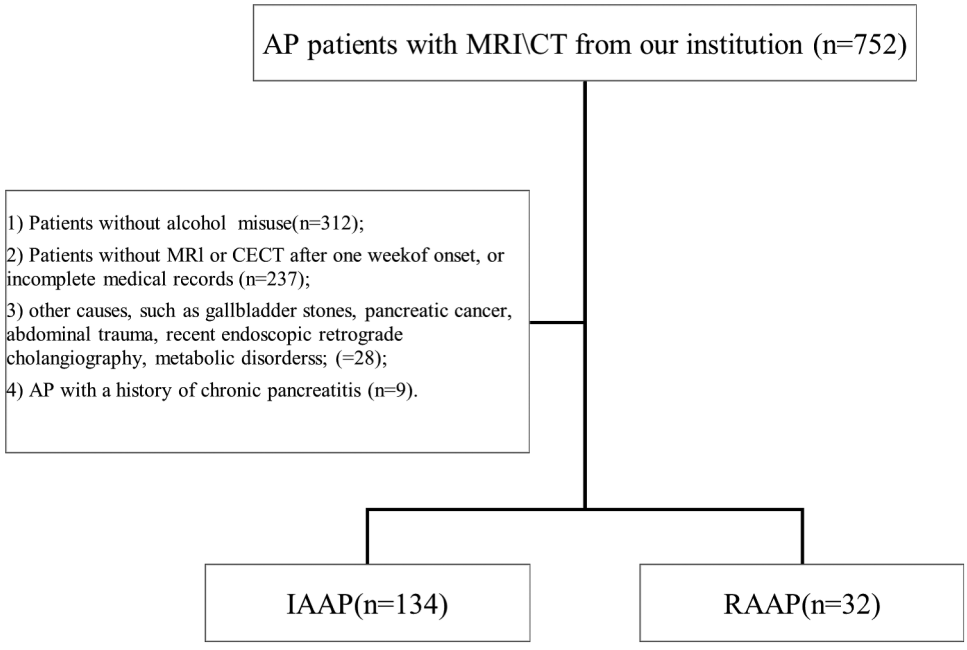

Figure 1. Patient selection flowchart for final diagnosis. IAAP, Initial Alcoholic Acute Pancreatitis; RAAP, Recurrent Alcoholic Acute Pancreatitis.

(triglyceride ≥11.3 mmol/L) at the time of admission (17).

Clinical and laboratory data

Medical records were reviewed for all patients to confirm patient age, sex, length of stay, leukocytes, serum Hypersensitivity C-Reactive Protein (Hs-CRP), internal serum creatinine, blood urea, glucose, calcium, phosphorus, lactic acid, triglyceride levels, and SIRS. The severity of AP was clinically based on the modified Marshall score and the APACHE II and BISAP scoring systems. According to the 2012 RAC (14). AP was graded as Mild Acute Pancreatitis (MAP), Moderate Severe Acute Pancreatitis (MSAP), and Severe Acute Pancreatitis (SAP).

CT and MRI techniques

CT-enhanced scans were performed by Somatom Definition AS + 128 and Siemens Healthineers. Key acquisition parameters included tube voltage = 120 kV, tube current = 200 mA, matrix = 512 × 512, field of view = 35 × 35 cm, collimation = 128 × 0.6 mm, reconstruction kernel = B30f, cpitch = 1.0, and slice thickness = 5.0 mm. Intravenous iodine contrast agents (Ultravist 370, Bayer Schering Pharma) were administered at 1.5 mL/kg and an injection rate of 3.54 mL/s, with delays of 25–30 s and 65–70 s in the arterial and portal vein phases, respectively.

MRI was performed on a 3.0-Tesla system (MR750, GE Medical Systems, Waukesha, WI). Sequences included axial Fast Recovery Fast Spin–Echo (FRFSE) MRI with fat suppression, coronal and Axial Single-Shot Fast Spin–Echo (SSFSE) T2-Weighted Images (T2WI), and 3D Liver Acquisitions with Acceleration-Flexible Volumes (3D LAVA flex), SSFSE radial series slab MR Cholangiopancreatography (MRCP), and fat-saturated 3D LAVA-flex dynamic enhanced MRI. The above parameters of the sequences are listed in Table 1. For the 3D LAVA dynamic enhanced scan, 20 ml of gadolinium (Magnevist; Schering Guangzhou, China) was administered intravenously at a rate of 2–3 mL/s, followed by a 20 mL saline solution flush. The scanning was performed at 16 seconds (early hepatic arterial phase), 30 seconds (hepatic arterial phase), 60 seconds (venous phase), and 120 seconds (delayed phase) after the injection.

All patients underwent CT-enhanced and/or MRI examinations upon hospitalization. Of the 166 patients, 67 patients had CECT only, 71 patients had MRI only, and 28 patients had both tests. Of the 28 patients, the most serious on the imaging examination were selected for a severity analysis; 4 patients were recruited with MRI, and 24 patients were recruited with CECT studies. Finally, 91 patients underwent CECT, and 75 patients underwent MRI. Of them, 72 patients with IAAP had CECT, and 62 patients had MRI; 19 patients with RAAP had CECT, and 13 patients had MR.

Imaging evaluation

Two radiologists with ≥3 years of abdominal imaging experience independently reviewed all initial CECT and MRI images without knowledge of the patient's laboratory testing and clinical process. They independently observed the findings of AP on CECT/MRI images and classified AP into Interstitial Edematous Pancreatitis (IEP) and Acute Necrotizing Pancreatitis (ANP) (18). Extrapancreatic inflammation (pleural effusion, ascites, retroperitoneal inflammation, mesenteric inflammation) (19) was also noted. The local complications of AP on CECT/MRI images were analyzed, including (1) Acute Peripancreatic Fluid Collection (APFC), (2) Acute Necrosis Collection (ANC), (3) Pancreatic Pseudocysts (PPC), and (4) Wall of Necrosis (WON).

MRSI has a similar value and parameters for the assessment of the severity of AP as the CTSI (20). However, MCTSI showed higher sensitivity in predicting AP severity than CTSI (21). As such, the severity of AP based on CECT/MRI was graded using the MCTSI scoring system (22). The severity scores on both CECT and MRI images were all derived from the same

Table 1. Parameters of the 3.0-T magnetic resonance imaging sequences.

Scanning Sequences	TR (ms)	TE (ms)	Section Thickness(mm)	Intersection Gap(mm)	Matrix	FOV (cm)
AxFRFSET2W	4500–6000	90–120	6	1	320×256	34×34
AxFRFSEfs-T2W	2500–3000	90–110	6	1	384×384	34×34
CorSSFSET2W	4500–6000	90–120	5	1	384×256	36×36
CorSSFSET2W	4500–6000	90–120	5	1	384×256	36×36
MRCP	4000–5000	900–1000	50	40–50	384×256	34×34
Ax3DLAVA-Flex	3.6–4.4	1.7–1.9	5.2	0	224×192	36×36
Ax3DLAVAC+*	3,6–4,4	1.7–1.9	5.2	0	224×192	36×36

*Dynamic enhanced imaging.
FOV, Field of View; MRCP, Magnetic Resonance Cholangiopancreatography; TR, Repetition Time;TE, Echo Time; T2W, T2-Weighted.

Table 2. Components of the severity scores on the modified computerized tomography/magnetic resonance imaging severity index.

Characteristics	MCTSI	MMRSI
Pancreatic inflammation		
Normal pancreas	0	0
Focal or diffuse enlargement	2	2
Intrinsic pancreatic abnormalities with inflammatory changes in pancreatic fat	2	2
Single, poorly defined fluid collection or phlegmon	4	4
2 or more poorly defined collection or presence of gas in or adjacent to pancreas	4	4
Pancreatic necrosis		
None	0	0
<30%	2	2
30%–50%	4	4
>50%	4	4
Extrapancreatic complications		
Ascites, pleural effusion, gastrointestinal tract involvement, vascular complications, parenchymal complications	2	2

Table 3. Components of the extrapancreatic inflammation on computerized tomography/magnetic resonance imaging score.

Sign of Extrapancreatic Inflammation	EPIC	EPIM
Pleural effusion		
None	0	0
Unilateral	1	1
Bilateral	2	2
Ascites in any location (perisplenic, perihepatic, interloop, or pelvis)		
None	0	0
1 location	1	1
>1 location	2	2
Retroperitoneal inflammation		
None	0	0
Unilateral	1	1
Bilateral	2	2
Mesenteric inflammation		
Absent	0	0
Present	1	1

parameters and were defined as MCTSI/MMRSI scores (Table 2). In addition, the EPIC and EPIM scoring systems were similar and strongly correlated (23). Therefore, extrapancreatic inflammation scores graded on CECT/MRI were also derived from the same parameters and defined as EPIC/M scores (Table 3).

Statistical analysis

Data analysis was conducted using SPSS 23.0 medical statistical software for Windows (Version 23.0, Chicago, IL, USA). A P value of $< .05$ was considered significant.

Statistical data analysis was performed, and continuous variables were expressed as the mean or median. Separate t-tests or Mann–Whitney U-tests were used for comparisons based on data distribution. Categories and hierarchical variables were expressed as percentages. The chi-square test or Fisher precision test was used to compare the two sets of counting data. The Wilcoxon test was used to assess agreements between observers. For data with good agreement, the average observer was used as the score; in other cases, the score was obtained after consultation between two observers.

Results

Demographics of the patients and their clinical features

Among the 134 patients with IAAP (male sex 94%), the average age was 44 years old (16 to 76 years old). In the 32 RAAP patients (male sex 100%), the median age was 43 years (18–73 years old). Following the 2012 RAC, the severity of AP did not differ significantly between the groups. Compared to patients with RAAP, those with IAAP were more likely to develop SIRS and respiratory failure ($P < .05$) and to have higher clinical scores (APACHE-II score, BISAP score), WBC, Hs-CRP, and AST and longer hospital stays ($P < .05$). The remaining trials are shown in Table 4.

Imaging characteristics

Among the 134 patients with IAAP, 74 patients (74/134, 55.2%) had IEP, and 60 patients (60/134, 44.8%) had ANP. Of the 32 RAAP patients, 23 patients (23/32, 71.8%) had IEP, and 9 (9/32, 28.2%) had ANP. The subtype, extent of pancreatic parenchymal necrosis and local complication composition between the groups are shown in Table 5.

No significant difference was found between patients with IAAP and those with RAAP for IEP and ANP ratios ($p > .05$) or the extent of pancreatic parenchymal necrosis ($P > .05$). The prevalence of ascites and mesenteric inflammation was higher in IAAP than in RAAP (ascites: 87.3% vs. 56.2%; $P = .01$; mesenteric inflammation: 73.8% vs. 56.2%; $P < .05$). For local complications, the prevalence of ANC was 38% and 18.7% in patients with IAAP and RAAP, respectively, with statistically significant differences ($P < .05$). The prevalence rates of APFC, PPC, and WON were not significantly different. A comparison of the severity of imaging scores between the two groups is shown in Table 5. The MCTSI/MMRSI, and EPIC/EPIM scores did not significantly

Table 4. Baseline demographics, clinical characteristics of patients with alcoholic acute pancreatitis.

Variables	IAAP ($n = 134$)	RAAP ($n = 32$)	p value
Hospital stay (d)	10(4–67)	8.5 (4-)41)	0.018*
Male sex(%)	126(94)	32(100)	0.356‡
Age (y)	44.0(16–76)	43.0(18–73)	0.542*
SIRS (%)	65(48.5)	9(28.1)	0.037‡
Respiratory failure (%)	30(22.3)	1(3.1)	0.006‡
Renal failure (%)	3(2.2)	0(0)	0.524‡
Circulatory failure (%)	3(1.4)	3(9.3)	0.651‡
APACHE II	4.0(0–17)	3.0(0–8)	0.019*
BISAP	1.0(0–4)	1.0(0–3)	0.048*
WBC (109/L)	13.5(3.7–24.7)	11.1(3.4–28.7)	0.001*
Hs-CRP (mg/L)	104.04(0.1–386)	80.43(0.9–247)	0.038*
Glucose (mmol/L)	8.31(3.8–33.8)	7.42(2.1–29.5)	0.211*
Ca (mmol/L)	2.24(1.1–5.5)	2.24(1.9–2.5)	0.315*
TG(mmol/L)	5.13(0.1–37,4)	6.42(0.9–32.2)	0.401*
AST(U/L)	30.5(1–460)	23.0(3–378)	0.031*
HCT	0.45(0.24–0.78)	0.43(0.27–0.62)	0.219*
AP severity (%)			0.170†
MAP	33(24.6)	13(40.6)	
MSAP	89(66.5)	16(50.0)	
SAP	12(8.9)	3(9.4)	

APACHE-II,Acute Physiology and Chronic Health Evaluation; BISAP, Bedside Index for Severity in Acute Pancreatitis; Hs-CRP, High-sensitivity C-Reactive Protein; TG, Triglycerides; AST, Aspartate Aminotransferase; HCT, Hematocrit.
*Data Are Mann–Whitney U-Tests.
†Data are chi-square tests.
‡Data are Fisher's exact test.

Table 5. Comparison of imaging features and severity score on Computerized Tomography/Magnetic Resonance Imaging between Initial Alcoholic Acute Pancreatitis and Recurrent Alcoholic Acute Pancreatitis.

Variables	IAAP ($n = 134$)	RAAP ($n = 32$)	p value
AP Classify(%)			0.086†
IEP (%)	74(55.2)	23(71.9)	
ANP (%)	60(44.8)	9(28.1)	0.193‡
Parenchymal necrosis alone (%)	9(15.0)	3(33.3)	
Peripancreatic necrosis alone (%)	15(25.0)	3(33.3)	
Parenchymal necrosis and peripancreatic necrosis (%)	36(60.0)	3(33.3)	
ANC (%)	51(38)	6(18.7)	0.039†
APFC (%)	19(14.1)	4(12.5)	0.805‡
PPC (%)	1(0.7)	0(0)	0.807‡
WON (%)	13(9.7)	3(9.3)	0.629‡
Ascites(%)	117(87.3)	18(56.2)	0.001†
Peritonitis (%)	98(73.1)	18(56.2)	0.061†
Mesentery- Inflammation (%)	99(73.8)	18(56.2)	0.049†
MCTSI/MMRSI	6.2(2–10)	5.2(2–10)	0.004*
EPIC/EPIM	5.4(0–7)	3.8(1–7)	0.004*

IEP, Interstitial Edematous Pancreatitis; ANP, Acute Necrotizing Pancreatitis; ANC, Acute Necrotic Collection; APFC, Acute Peripancreatic Fluid Collection; PPC, Pancreatic Pseudocyst; WON, Wall-Off Necrosis; MCTSI/MMRSI, Modified CT/MRI Severity Index; EPIC/EPIM, Extrapancreatic Inflammation on CT/MRI.
*Data Are Mann–Whitney U-Tests.
†Data are chi-square tests.
‡Data are Fisher's exact test.

differ between the 2 readers according to Wilcoxon tests ($P = .862$; $P = .881$).

Discussion

In this study, we found that systemic complications (SIRS, respiratory failure) are more prevalent in IAAP, and hospital stays are also longer than those in RAAP. The prevalence of local complications such as ANC, ascites, and mesenteric inflammation on CECT/MRI images is higher in IAAP than in RAAP. In addition, the severity scores based on both imaging and clinical scoring systems suggest that patients with IAAP had more severe disease than those with RAAP. However, the difference in the type of AP and the extent of parenchymal necrosis between IAAP and RAAP was not statistically significant. Currently, this study is the first report to compare IAAP with RAAP by both imaging and clinical characteristics. Our results are helpful for different care paths for IAAP and RAAP, which are essential for management and timely treatment in clinical practice.

We found that males accounted for 94% of the IAAP group and became 100% of the RAAP group in this study, suggesting that in China, the majority of patients with initial or recurrence of AAP are male.

SIRS is a clinical indicator for the severity of pancreatitis and a cause of early organ failure in hospitalized patients (16). Our study found that the prevalence of SIRS assessed on admission in IAAP was significantly higher than that in RAAP, characterized by a higher incidence of respiratory failure, more extended hospital stays and higher clinical scores (APACHE II, BISAP), consistent with literature reports (24). In addition, Hs-CRP, a clinical indicator of AP severity, was significantly elevated in IAAP (25). However, our results showed no significant difference in the percentages for MAP, MSAP and SAP based on 2012 RAC between IAAP and RAAP, consistent with previously reported findings (7). The underlying causes of this situation are still under discussion.

In this study, the classification, subtype, and extent of parenchymal necrosis of AP were not significantly different between IAAP and RAAP on CECT/MRI images. However, the prevalence of ANC, ascites, and mesenteric inflammation was higher in IAAP than in RAAP on the CECT/MRI images ($P < .05$). The possible reason for this finding may be the increased release of various cytokines and vasoactive substances in IAAP after alcohol exposure, resulting in a higher prevalence of extrapancreatic necrosis and more significant peripancreatic exudation (26). The pancreas is unable to recover adequately from recurrent episodes of acute pancreatitis, perpetuating chronic inflammation and irreversible fibrosis (27,28). Repeated AP injury leading to pancreatic fibrosis was also confirmed in animal experiments (29,30). Meanwhile, a study showed that increased pancreatic fibrosis reduces the inflammatory cascade of acute-on-chronic pancreatitis (31). As such, RAAP possibly has a weaker inflammatory cascade than IAAP due to increased fibrosis. Our results indicate that peripancreatic inflammation was more pronounced in IAAP patients and more likely to develop into ANC, ascites, and mesenteric inflammation than in RAAP patients on CECT/MR images (Figure 2). However, there was no significant difference between long-term complications (>4 weeks), such as WON and PPC, possibly due to the short length of hospital stay in this study. In addition, nearly half of the WON already developed demarcated collections within three weeks after the onset of ANC (32), which may explain the appearance of WON in patients with IAAP. This is the first report of the features of IAAP and RAAP on CECT/MR images. The MCTSI and MMRSI scoring systems are strongly correlated with pancreatic parenchymal necrosis and peripancreatic inflammatory and exudative changes (22). In our study, the MCTSI/MMRSI scores were higher in IAAP than in RAAP. We speculate that extrapancreatic inflammation and

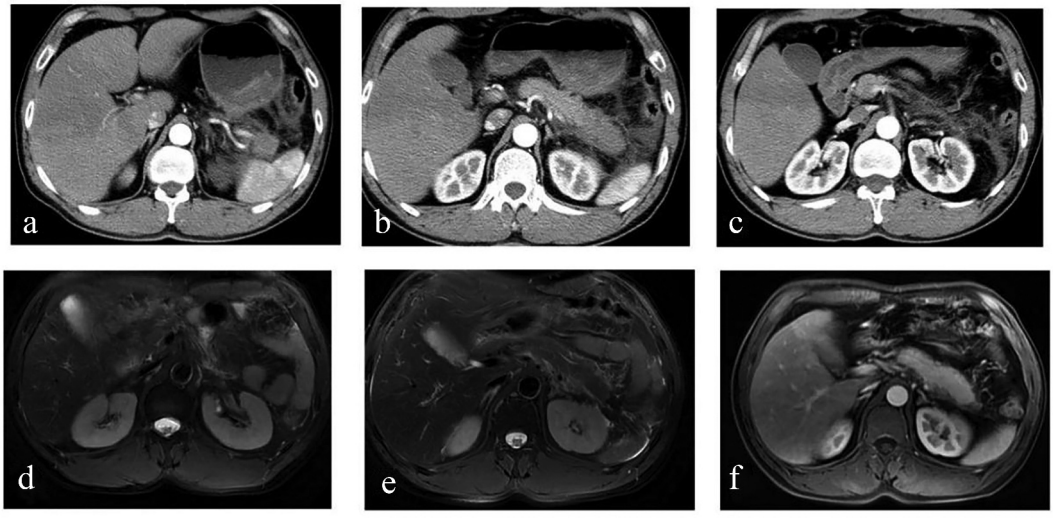

Figure 2. A 53-year-old male with long-term alcohol misuse. Initial Alcoholic Acute Pancreatitis: the contrast-enhanced CT arterial phase images show pancreas enlargement with decreased density in the body and tail of pancreas, an irregular collection around the tail of the pancreas; MCTSI = 6 points, EPIC = 4 points (image a-c). Recurrent Alcoholic Acute Pancreatitis: Recurrence after the onset of acute pancreatitis 1 year later, axial fast recovery fast spin echo with fat suppression T2-weighted MR images show a small amount of peripancreatic exudate (image d-e). axial contrast-enhanced T1-weighted MR image shows a uniform enlargement of the pancreas with the homogeneous signal; MMRSI = 4 points; EPIM = 3 (image f). MCTSI/MMRSI, Modified CT/MR Severity Index; EPIC/M, Extrapancreatic Inflammation on CT/MR.

peripancreatic aggregation were more pronounced in IAAP. The possible reasons are that pathophysiologically, AP is associated with inflammatory cascade activation (3,33) which leads to inflammation in the pancreas and pancreatic fat/tissue, edema, liquefaction, and necrosis in islets and extrapancreatic fat cells (33). RAAP possibly has a weaker inflammatory cascade than IAAP due to increased fibrosis (31). However, the lack of a significant difference in the prevalence and extent of pancreatic parenchymal necrosis between the two groups may be due to the small number of patients with RAAP and the small sample size in this study.

The EPIC/EPIM scoring system focuses on systemic inflammation (such as pleural effusion, ascites, retroperitoneal inflammation, and mesenteric inflammation) (23). Lower EPIC scores for RAP have been reported in the previous literature (34). In this study, we found that EPIC/EPIM scores were lower in RAAP than in IAAP ($P < .05$). The possible reason is the higher inflammatory cascade in patients with IAAP, resulting in a higher incidence of ascites and mesenteric inflammation (19,35).

The study has its limitations. First, the study was a retrospective analysis in which physicians estimated the extent of alcohol abuse and alcohol consumption in patients with IAAP and RAAP after asking for detailed personal histories. However, alcohol consumption may vary significantly from patient to patient over a year or month. Second, Limited by strict inclusion and exclusion criteria, the sample size of RAAP is small and lacks patient concordance between the groups, which resulted in no significant difference in some clinical indicators between IAAP and RAAP. Third, while some patients (34/166) met the diagnostic criteria of both AAP and hyperlipidemic pancreatitis at the time of admission, we did not distinguish if the suspected cause of AP was hyperlipidemicl-related. Therefore, a larger sample size and more objective indicators should be performed for the RAAP study in the future.

In summary, peripancreatic inflammation was more pronounced in IAAP patients and was more likely to develop into ANC, ascites, and mesenteric inflammation than in RAAP patients on CECT/MR images. Both imaging and clinical scoring suggested that the severity of IAAP was significantly higher than that of RAAP. These results may indicate differences in early admission care between IAAP and RAAP, and the goals for RAAP could focus more on reducing the length of stay and cost. Future studies are needed to determine whether individualized treatment planning, with consideration of the recurrent episode, can reduce the length of stay and cost. In addition, we recommend that abstaining from alcohol would be important after either type of alcoholic pancreatitis to prevent re-hospitalization.

Authors' contributions

XMZ, XHL and WHX proposed the study. WHX, XHL, LJY, ZT, CC, CL and HZL performed research, and collected the data. WHX and XMZ analyzed the data and wrote the first draft. All authors contributed to the interpretation of the study and to further drafts. All authors read and approved the final manuscript. XMZ is the guarantor. WHX and XHL contribute equally to this work.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Consent for publication

All authors gave consent for the publication of this paper.

Ethics approval and consent to participate

This retrospective study was approved by the institutional review board of the Affiliated Hospital of North Sichuan Medical College. Due to a retrospective study, the patient consent for the study was waived.

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Data availability statement

Please contact the corresponding author for data requests.

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