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ORIGINAL ARTICLE

Clinical Outcomes and Prognostic Significance of Early vs. Late Computed Tomography in Acute Pancreatitis

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ABSTRACT

Background and Aim: The prevalence of acute pancreatitis is still high with a mortality rate of 10-20% for the past two decades. Acute pancreatitis can be prognosis with computed tomography (CT) which correlates clinical outcomes, complications, and associated mortality rate. The current study aims were to evaluate the clinical outcomes and prognostic significance of early vs. late computed tomography in acute pancreatitis.

Methodology: A cross-sectional study was carried out on 136 consecutive acute pancreatitis patients in the department of Gastroenterology and Radiology, Bahawal Victoria Hospital, Bahawalpur for duration of one year from August 2020 to July 2021. Patients with no abdominal CT due to pregnancy and CT performed after 14 days of pain onset were excluded. All the patients were categorized into two groups; Group-I where CT was performed after 4-5 days of pain onset and Group-II CT performed after 6-14 days of pain onset. The CT findings such as prognostic information, CT severity index and local complications were compared in both group. For data collection and analysis, SPSS version 21 was used.

Results: Of the total 136 acute appendicitis patients, 92 (67.6%) were male and 44 (32.4%) were females with an age range of 18 to 60 years. The overall mean age was 42.45± 11.62 years. Group-I had 72 patients (early CT performed) and Group-II had 64 (47.1%) patients of late CT performed. The mean severity index of CT performed in early and late was 5.43±2.31 and 6.59±2.6; p=0.005). The severity index of CT was higher in late-performed computed tomography compared to early perform CT. The persistent organ failure had an almost similar incidence in both early and late CT performed (37.4% versus 48.7%; p<0.125). Late CT performed group majority patients had local complications 82.6% compared to 67.4%; p<0.021. No significant variance was found in surgery, percutaneous drainage need, and mortality (p>0.05).

Conclusion: Our study found that early CT does not have a negative impact on the outcome of acute pancreatitis. However, local complications were detected with the onset of symptoms in computed tomography after 5-days. Performing computed tomography before the hospitalization sixth day does not result in earlier intervention.

Keywords: Computed tomography, Acute pancreatitis, Clinical outcomes

INTRODUCTION

The prevalence of acute pancreatitis is still high with a mortality rate of 10-20% for the past two decades. Acute pancreatitis can be prognosis with computed tomography (CT) which correlates clinical outcomes, complications, and associated mortality rate [1, 2]. Pancreatic necrosis occurs in 5% to 20% acute pancreatitis patients. Some studies suggested that pancreatic necrosis is the predicting parameter of morbidity and mortality due to its association with local complication, hospitalization duration, and mortality [3, 4]. As a result, assessment of pancreatic necrosis has been associated with grade of CT, resulting in the severity index of CT [5]. Nonetheless, modern research has considered the significance of necrosis in predicting the patient's prognosis. Few studies reported no link between clinical outcomes such as systemic complications, hospitalization duration, and mortality and pancreatic necrosis [6, 7]. The workhorse investigation for identifying and classifying complications of acute pancreatitis is computed tomography (CT) [8].

During acute pancreatitis later stage, patients with symptomatic complications undergo surgical intervention and radiological examination such as necrosis with pancreatic infection whereas patients with lack of improvement in clinical condition regardless of supportive management undergo intervention [9]. Systematic inflammatory response is used for diagnosing acute pancreatitis early stage within 6 days [10, 11], which can result in significant physiological deterioration and understandable clinical concern. The most common reason for "too early" CT is a craving to enhance the outcomes through intervention at early stages. Also, few argued that the initial CT timing should be based on the onset of symptoms rather than the admission date, as stated in the guidelines [12]. Recent research has found that early CT does not have a negative impact on the outcome of acute pancreatitis [13]. This cross-sectional study was conducted to compare the significance of prognostic information and clinical outcomes acquired by performing CT early vs. late.

METHODOLOGY

A cross-sectional study was carried out on 136 consecutive acute pancreatitis patients in the department of Gastroenterology and Radiology, Bahawal Victoria Hospital

Bahawalpur for duration of one year from August 2020 to July 2021. Patients with no abdominal CT due to pregnancy and CT performed after 14 days of pain onset were excluded. All the patients were categorized into two groups; Group-I where CT was performed after 4-5 days of pain onset and Group-II CT performed after 6-14 days of pain onset. The CT findings such as prognostic information, CT severity index, and local complications were compared in both group. Acute pancreatitis is diagnosed based on abdominal pain, radiological findings, and elevation of lipase or amylase at least three times normal. Ethical approval was taken from the respective institutional ethical committee. Patients who presented within 72 hours of symptoms onset had performed computed tomography 3 days later, whereas patients who presented later had CT on the same day. Demographic, radiological data, laboratory, and clinical as well as treatment details were collected for the enrolled patients. Organ failure, radiological/endoscopic intervention need, local complications, surgery, and mortality were all evaluated. For categorical variables, descriptive data were presented as percentages, and quantitative variables were presented as mean ± standard deviation (SD). The student's t-test was used to compare continuous variables, while the Chi-squared test was used to compare categorical variables. A P-value of 0.05 was deemed significant.

RESULTS

Of the total 136 acute appendicitis patients, 92 (67.6%) were male and 44 (32.4%) were females with an age range of 18 to 60 years. The overall mean age was 42.45± 11.62 years. Group-I had 72 patients (early CT performed) and Group-II had 64 (47.1%) patients of late CT performed. The mean severity index of CT performed in early and late was 5.43±2.31and 6.59±2.6; p=0.005). The severity index of CT was higher in late-performed computed tomography compared to early perform CT. The persistent organ failure had an almost similar incidence in both early and late CT performed (37.4% versus 48.7%; p<0.125). Late CT performed group majority patients had local complications 82.6% compared to 67.4%; p<0.021. No significant variance was found in surgery, percutaneous drainage need, and mortality (p>0.05). The prevalence of male and female patients (gender distribution) as shown in Figure-1.

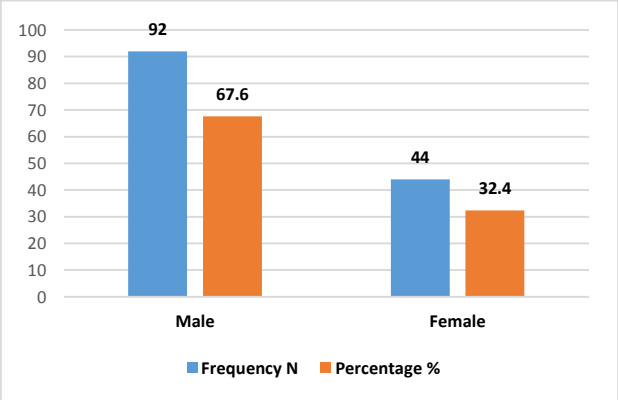

Figure 1: Gender distribution (n=136)

Table-I compares the demographic details and clinical profiles of early and late computed tomography (CT). Upon comparing early and late computed tomography groups, no substantial differences were found in age, hematological (leukocyte count), etiology, and others parameters. Also, both groups had no significant difference in clinical presentation such as fever, pain, and jaundice except mass presence frequency which was elevated in early computed tomography (33%) compared to late computed tomography 54.6% (p=0.001). Clinical outcomes of both groups were compared in Figure-2.

Table 1: demographic details and clinical profile of both groups

Parameters	Early Computed Tomography n=72	Late Computed Tomography n=64	P-value
Age (years)	43.23±12.64	44.01±13.7	0.92
Etiology n (%) Gall stones	21 (29.2)	28 (43.6)	0.092
Haematocrit (%)	34.86±6.45	32.76±7.65	0.068
Total leukocyte count (per mm3)	15842±5673	15932±7754	0.91
Serum albumin (g/dL)	3.51± 1.71	3.06±0.61	0.213
Serum creatinine (mg/dL)	1.23±1.74	1.23±1.62	0.74
Mass, n (%)	24 (33%)	35 (54.6%)	0.001
Pain, n (%)	71 (98.6%)	64 (100%)	0.002
Ascites n (%)	42 (58.3%)	43 (67.2%)	0.164
Jaundice n (%)	4 (5.6%)	2 (3.12%)	0.213
Pleural Effusion, n (%)	62 (86.1%)	57 (89.1%)	0.76
CT Severity Index	5.43±2.31	6.59±2.6	0.005

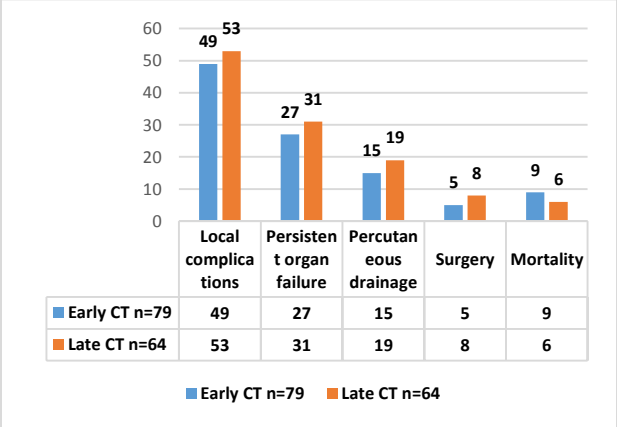

Figure 2: Comparison of clinical outcomes in both groups.

DISCUSSION

The assessment of acute pancreatitis in enrolled patients revealed that based on CT grades findings from early and late CT patients were categorized into early versus late and play role as a sensitive indicator for the clinical outcomes of patient's investigations and pancreatitis severity. These findings support the findings of other studies with fewer patients [14, 15]. Based on recommended guidelines

enhanced computed tomography of the abdomen was performed after 72 hours of symptoms onset as pancreatitis necrosis extent might be underestimated in early computed tomography. However, pancreatitis necrosis development and acute pancreatitis with local complications is the dynamic process after 72 hours of symptoms onset [16].

The studies advocated a wide range of time intervals between acute pancreatitis attack and the CT scan performed between 3 and 10 days [17, 18]. Consequently, to get acute pancreatitis severity level, performing CT scans of abdomen within the 10 days would be suitable time for acute pancreatitis. The present study also revealed that more local complications were detected on computed tomography performed after 5 days of symptoms compared to 3 days [19]. Additionally, the late CT group had a significantly higher mean computed tomography severity index (CTSI) than early performed CT. The CTSI is composed of two mechanisms: I) Balthazar grade, which considers the collection of peri-pancreatic presence; II) Necrosis score; in which CTSI variance could be attributed to detection of an increased frequency of necrotic and acute fluid collections [20, 21].

Consequently, determining the pancreatic necrosis extent and local complications is critical for accurate prognosis. Pancreatic necrosis usually appears 2–4 days after an acute attack begins and rarely progresses. As a result, CT performed 3 days after the onset of an AP attack would accurately demarcate the pancreatic necrosis, However, our results demonstrated that performing CT for acute pancreatitis onset after 5 days would detects local complications best [22]. As a result, we no longer perform CT at the time of admission, but rather 5 days after AP onset.

Latest research reported that acute pancreatitis does not intensify by early CT, actually, offers useful information regarding prognosis [23, 24]. Our study also revealed that early CT does not have a negative impact on the outcome of acute pancreatitis, and clinical parameters like percutaneous intervention need and mortality were not diverse between both groups. No intervention was resulted in patients who underwent CT examinations after 6th days of hospitalization. This study confirms without a doubt the intervention frequencies differences caused by early CT versus late CT examinations [25].

CONCLUSION

Our study found that early CT does not have a negative impact on the outcome of acute pancreatitis. However, local complications were detected with the onset of symptoms in computed tomography after 5-days. Performing computed tomography before the hospitalization sixth day does not result in earlier intervention.

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