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Original Research Article

A hospital based cross sectional study of acute pancreatitis with special reference to computed tomographic evaluation

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ABSTRACT

Background: All suspected cases of acute pancreatitis should undergo CT scan. It is non invasive and reliable. CT scan is able to give complete picture of acute pancreatitis. The objective of the present
Methods: The present study was hospital based. 60 cases with evidence of acute pancreatitis were included. They were studied for 3 years from June 2015 to May 2018. CT scan was performed in all cases. CT features of the pancreas were noted and described.
Results: Acute pancreatitis incidence was four times more in males compared to females i.e. 80% vs. 20%. CT scan showed that pancreatic gland was normal only in 16.7% of the cases. The contour was irregular in 66.7% of the cases. Eight cases showed necrosis. Less than 30% three patients (10%) had grade A acute pancreatitis. 28 cases were showing Phlegmonous changes. In 24 cases it was observed that lesser sac was affected.
Conclusions: Authors conclude that for grading and staging of the pancreatitis of acute nature, CT scan is must and is very helpful to the clinicians. CT scan helps not only in precise diagnosis but also in predicting the proper prognosis of the patients who are affected by the pancreatitis of acute in nature.

Keywords: Acute pancreatitis, CT scan, CTSI, Prognosis, Staging

INTRODUCTION

Pancreatitis of acute nature is not rare as it is thought of. There is inflammation of pancreas which is not specific. Acute pancreatitis is multifactorial in nature. Various factors like alcohol, hyperlipoproteinemia, hypercalcemia, drugs, scorpion venom, genetic factors can lead to the condition of acute pancreatitis. Mechanical causes of acute pancreatitis include cholelithiasis, after gastric or biliary surgery, after trauma, retrograde pancreatography, obstruction of the pancreatic duct, and tumor of the pancreas, infestation by ascaris or obstruction of duodenum. Vascular causes of acute pancreatitis include after cardio pulmonary bypass surgery, polyarteritis nodosa or atheroembolism. Infections like mumps, Coxsackie virus can also cause acute pancreatitis.[1]

The pathophysiology of acute pancreatitis is still not very clear. Enzymes are suddenly released into interstitial tissues which are adjacent to pancreas due to blockage of the pancreatic duct. These enzymes lead to auto digestive fat necrosis which can cause non specific inflammation of the pancreas and tissues surrounding to pancreas.[2]

It is difficult to diagnose acute pancreatitis based on history and clinical features. Even serum amylase may remain normal if the patient presents late to outpatient department. Elevated levels of serum amylase can be seen in abdominal conditions other than acute

pancreatitis. Hence it cannot be relied upon totally. Hence reliable imaging modality is the cornerstone of diagnosis of acute pancreatitis.[3]

Abdominal X rays, chest X rays and barium studies are not very specific for diagnosis of acute pancreatitis. They are positive only in severe disease and that too in very few cases.[4]

During an early period of an episode of acute pancreatitis, ultrasonography should be done. This is done to rule out the presence of stones in the gall bladder and common duct. But this is not going to help do the staging of acute pancreatitis. It becomes difficult to clearly see the pancreas by ultrasonography due to presence of gas in the bowel and fluid in the abdomen.[5]

Hence all suspected cases of acute pancreatitis should undergo CT scan. It is noninvasive and reliable. CT scan is able to give complete picture of acute pancreatitis and not only this; it is also useful in telling the normality of surrounding structures of pancreas.[6]

Hence present study was carried out to evaluate the role of CT scan in the acute pancreatitis.

METHODS

The present hospital based evaluation study was carried out among 60 clinically suspected cases of acute pancreatitis patients in the Department of Radio-Diagnosis at a tertiary care hospital from June 2015 to May 2018.

All cases referred for CT scan with clinical suspicion of acute pancreatitis were included in the present study.

Patients were suspected to have acute pancreatitis based on history and investigations. These suspected cases were included in the present study.

Suspected cases of acute pancreatitis were subjected to a detailed clinical history and a thorough examination i.e. local as well as systemic. All these 60 cases were subjected for CT scan.

Informed written consent was obtained from all patients who were eligible to be included in the present study. Institutional Ethics Committee permission was also taken.

Equipment

The study was performed using Wipro GE CT / e high speed helical computed tomography machine. Operating system is guided and performed via keyboard. The images were stored on a magnetic disc or conventional film. The entire system operates at temperature of 16 to 18 degree Celsius. Images can be reconstructed three dimensionally from a series of adjacent axial slice images.

Protocol of scanning

- Scout image: antero posterior
- Land mark: Xiphoid
- Slice plane: Axial
- Intravenous contrast: About 100ml of 60% iodinated contrast medium
- Rate of injection: 1.5 to 2ml/sec for 15seconds, followed by 1ml/sec
- Oral contrast: 400 ml in 45min before scanning and 200 ml just before scanning
- Breath hold: suspended expiration
- Slice thickness: 8-10mm, 5mm in the region of interest
- Slice interval: contiguous
- Start location: lung bases
- End location: Iliac crest
- Filming: Soft tissues window setting 350/50.

Statistical analysis

The data was analyzed using proportions.

RESULTS

Acute pancreatitis incidence was four times more in males compared to females i.e. 80% vs. 20%. The male to female ratio was 4:1. No case of acute pancreatitis was seen in females up to 50 years of age. 50% of the cases were seen above 60 years of age in females. But in males all cases were almost evenly distributed among males from age 21 years to more than 60 years with more cases seen in the age group of 21-40 years.

Table 1: Distribution of study subjects as per age and sex.

Age (years)	Male		Female		Total	
	No.	%	No.	%	No.	%
0-20	4	8.3	0	0	4	6.7
21-40	22	45.8	0	0	22	36.7
41-60	16	33.3	6	50	22	36.7
> 60	6	12.5	6	50	12	20
Total	48	80	12	20	60	100

CT scan showed that pancreatic gland was normal only in 10 cases. The contour was irregular in 40 cases. 16 cases showed necrosis of less than 30% and more than that in three cases each. Density of the pancreas was normal in 10% of the cases. Pleural effusion was found in 44 cases and same number for ascitic changes. There was evidence of pseudo cyst formation in eight cases. Phlegmonous changes were seen in 28 cases. Gas was found in eight cases. 42 cases showed peri pancreatic changes while 4 cases showed distorted architecture of the gland. Focal density of the gland was seen in 40 cases.

Six patients (10%) had grade A acute pancreatitis. 14 patients (23.3%) had grade B. 30 patients (50%) had grade C. 2 patients (3.3%) had grade D and 8 patients (13.3%) had grade E acute pancreatitis.

Table 2: Distribution of study subjects as per signs observed on CT scan.

Sign	Number	%
Normal gland	10	16.7
Diffuse enlargement of the gland	28	46.7
Focal enlargement of the gland	22	36.7
Regular contour of the gland	20	33.3
Irregular contour of the gland	40	66.7
Less than 30% necrosis	16	26.6
30-50% necrosis	6	10
More than 50% necrosis	6	10
Iso-density of the gland	6	10
Focal density of the gland	40	66.7
Generalized hypo-density of the gland	10	16.7
Distorted architecture of the gland	4	6.6
Peri-pancreatic changes of the gland	42	70
Gas/abscess in the gland	8	13.3
Phlegmonous changes in the gland	28	46.6
Evidence of pseudo cyst formation	8	13.3
Ascitic changes	44	73.3
Pleural effusion	44	73.3

Thirty-two patients have CT severity index of 0-3. 16 patients were found to be having CT severity index ranging from 4 to 6. 12 patients were noted to have CT severity index of range from 7 to 10.

Table 3: Grade wise distribution of acute pancreatitis.

Grade	Number	%
A	6	10
B	14	23.3
C	30	50
D	2	3.3
E	8	13.3
Total	60	100

Table 4: CT severity index wise distribution of patients.

CT severity index	Number	%
0-3	32	53.3
4-6	16	26.7
7-10	12	20
Total	60	100

Table 5: Site wise distribution of changes in the pancreas.

Anatomical site	Number	%
At the site of mesentery/mesocolon	8	13.3
At the site of para renal space	10	16.7
At the site of lesser sac	24	40

Fourteen cases were found showing phlegmonous changes. The lesser sac was involved in 12 cases, para renal space was involved in 5 cases and involvement of mesocolon and mesentery was seen in 4 cases. Out of these 14 cases 7 cases had shown involvement of more than one anatomical site

DISCUSSION

Present study was a hospital based cross sectional study among 60 cases of suspected acute pancreatitis. Contrast medium used was non-ionic and it was water soluble. A good contrast was obtained. CT spiral machine was used. Zwicher et al, also used the similar tool and hence results correlated with the present study.[7] All 60 cases under study received the contrast medium and no one reported any side effects.

Out of 60 cases studied, 48 were males and 12 cases were female. More number of males may be due to the fact that alcohol use is more in males many folds as compared to the females. And this led to the increased incidence of acute pancreatitis in males.[8]

Most cases were seen in the age group of 21-40 years. Other studies also report similar findings similar to the present study.[8] Younger age group of less than 20 years of age had very few cases. they were due to certain specific causes like auto-immune reaction after renal transplant, and after injury etc.

In 50 cases there was pancreas enlargement i.e. 83.3% of the cases. Out of these 50 cases, there was focal enlargement seen in 22 cases and diffuse enlargement was seen in 28 cases. This finding in the present study was similar to that of other studies where the authors also reported pancreas enlargement in 80-90% of the cases of acute pancreatitis.[9,10]

Forty-two cases showed stranding of the fat in the peri pancreatic area i.e. 70% of the cases constituted that. 28 cases were found showing phlegmonous changes. Lesser sac was involved. More than one anatomical site in the pancreas was seen involved in 14 cases. These findings are similar to the findings seen in other studies.[9,10]

In the present study 6 patients (6.6%) had grade A, 7 patients had grade B, 30 patients (50%) had grade C, 2 patients (3.3%) had grade D and 8 patients (13.3%) had grade E pancreatitis.

Balthazar et al, reported that 14.5% patients were in grade A, 29.9% of the patient was in grade B, 25% of the patients were in grade C, 14.5% of the patients were in grade D and 27.7% of the patients were in grade E.[11]

Balthazar et al, devised the severity index based on the findings of the CT scan and based on the proportion of necrosis in the pancreas.[12]

Authors used the same severity index based on CT scan. "grades A to E patients were assigned 0-4 points plus two points for necrosis of less than 30%, four points for necrosis of 30-40% and six points for more than 50% of the necrosis of the pancreatic gland. This calculated CTSI grading into three categories more accurately reflects the early prognostic value of CT. They found that patients with a CTSI of 0-2 had no mortality and 4% morbidity. In contrast a CTSI of 7-10 yields a 17% mortality and 92% complication rate."[12]

Thirty-two cases were found to have CT severity index of 0-3 in the present study. 16 cases were with 4-6, 12 cases with 7-10. Authors observed that CT severity index predicted mortality as 75% of the cases i.e. 6 out of 8 who died were found to have CT severity index of more than 7. Patients who had a CT severity index was less than six, recovered well. Score of less than 3 was found to be associated with less duration of hospital stay and less number of complications. Balthazar et al, also reported similar findings.[12]

CONCLUSION

Acute pancreatitis affects mainly males. Necrosis should be suspected in all cases of acute pancreatitis and should be ruled out by CT scan. CT scan has been found to be useful not only in the diagnosis but also was found to be useful in grading of the pancreatitis of acute in nature. CT scan was also found to be helpful to grade the course of the pancreatitis of acute in nature.

In the present study, CT scan also predicted the future outcome i.e. prognosis of the patients with acute pancreatitis near to accuracy. Hence authors recommend that clinicians should use the CT scan in patients with acute pancreatitis.

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