



Original Research Article

Weight and histopathological changes in pancreas in alleged suicide cases

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ABSTRACT

Introduction: Pancreas will respond differently to stress situations, which results in histopathological changes in the gland. Glucagon and insulin are both secreted by pancreas, the former by alpha cells and latter by beta cells. Insulin may decrease during stress. These endocrine secretions enter the portal vein so that liver is exposed to high concentration of these hormones. This along with increase in its antagonistic hormones can contribute to the stressed induced hyperglycaemia.

Aims & Objective: The aim is to find and compare the weight and histopathological changes of Pancreas in suicide and non suicide deaths.

Materials and Methods: The pancreas were dissected during the autopsy from the cases with known history of death due to alleged suicide with clear history of non administration of steroids and was declared brought dead at GMCH, Chandigarh. The removed glands were preserved and fixed with 10% formalin for more than 2 weeks. After the period of fixation, grossing and section of gland was done, and slides of each subject was prepared and studied.

Results: In suicide group maximum weight is 78.2 grams and minimum is 67.3 grams. In non suicide maximum weight is 78.2 grams and minimum is 65.5 grams. The mean weight of the pancreas in the suicidal group was 71.27 grams and the standard deviation was 2.18 grams, whereas the mean weight of the pancreas in the non- suicidal group was 70.87 grams and the standard deviation was 2.63 grams. The P value comes out to be 0.41. Of the total 100 cases, only three (3%) revealed significant pathological findings and the rest 97 (97%) were histologically normal. In the study group there was one case each of pancreatic abscess, and necrotising pancreatitis. Pancreatitis abscess was diagnosed when the histology revealed focus of necrosis of the pancreatic parenchyma with dense neutrophilic infiltration. Necrotising pancreatitis showed extensive necrotising inflammation of the pancreatic parenchyma. In the control group there was only 1 case (2%), of chronic pancreatitis. Chronic pancreatitis was labelled when fibrosis of the pancreatic parenchyma with mild lymphomononuclear cell infiltration.

Conclusion: There was no significant difference between the weight of the pancreas in the suicidal and the non-suicidal group. Pathological findings were twice as common in the suicidal group as compared to the non-suicidal group.

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1. Introduction

Suicide, a generally treatable consequence of undiagnosed depression, which takes the untimely life of an individual. The family members are the one who suffered mostly after this tragic step. Death due to suicide is around 8,00,000

very year, which accounts one death every 40 seconds.¹ Pancreas will respond differently to stress situations, which results in histopathological changes in the gland.² Glucagon and insulin are both secreted by pancreas, the former by alpha cells and latter by beta cells. Insulin may decrease during stress. These endocrine secretions enter the portal vein so that liver is exposed to high concentration of these hormones. This along with increase

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in its antagonistic hormones can contribute to the stressed induced hyperglycaemia.³

The pancreas (Figure 4) develops as 2 buds of endoderm from the primitive duodenum at the junction of the foregut and the midgut. A small ventral bud forms the lower part of the head and the uncinata process of pancreas, whereas a large dorsal bud forms the upper part of the head as well as the body and tail of the pancreas.⁴ The ventral bud rotates behind the duodenum dorsally from right to left and fuses with the dorsal bud, and the duct of the distal part (body and tail) of the dorsal bud unites with the duct of the ventral bud to form the main pancreatic duct (of Wirsung). Because the common bile duct (CBD) also arises from the ventral bud, it forms a common channel with the main pancreatic duct. The remaining proximal part (head) of the duct of the dorsal bud remains as the accessory pancreatic duct (of Santorini). The head of the pancreas lies in the duodenal C loop in front of the inferior vena cava (IVC) and the left renal vein. The pancreas is a composite gland containing both exocrine and endocrine components.⁵ Acini, formed of zymogenic cells around a central lumen, are arranged in lobules. Each lobule has its own ductule, and many ductules join to form intralobular ducts, which then form interlobular ducts that drain into branches of the main pancreatic duct. Scattered throughout the gland are pancreatic islets (clusters) (of Langerhans) containing beta cells (about 75% of islets; these secrete insulin), alpha cells (about 20% of islets; these secrete glucagon), delta cells (these secrete somatostatin) and several other hormone-secreting cells. Islets constitute only about 2% of the pancreatic parenchyma.⁶

The pancreas is a mixed endocrine and exocrine glands, divided into head, body and tail. The head is located in the C-shaped curve of the duodenum, body and tail extended towards the left. The islets of langerhans are called an endocrine unit of pancreas, they are more prevalent in the tail of the pancreas.⁷ On H&E staining, islets of langerhans appears pale with intensely stained surrounding area, but after Zenker-formol fixation and staining by the mallory Kazan method, three type of cells can be identified A, B, D cells, which secretes glucagon, insulin and somatostatin respectively.⁸

2. Aims and Objectives

The aim is to find and compare the weight and histopathological changes of Pancreas in suicide and non suicide deaths.

3. Materials and Methods

The pancreas were dissected during the autopsy from the 50 suicide and 50 non suicide cases with clear history of non administration of steroids and was declared brought dead at GMCH, Chandigarh. The removed glands were preserved and fixed with 10% formalin for more than 2 weeks. After

the period of fixation, grossing and section of gland was done, and slides of each subject was prepared and studied.

4. Results

4.1. Age

The 50 suicide and 50 non suicide deaths cases with age group from 11-20 yrs to 81-90 yrs were included in this study. Table 1 indicates that in suicide deaths age group 21 to 30 years was the commonest and in non suicide deaths age group 41 to 50 yrs was commonly involved.

4.2. Sex

Figure 1 indicates the sex wise distribution of suicide cases with 36(72%) were male and 14(28%) were females. Figure 2 shows the sex wise distribution in non-suicide deaths with 38(76%) were males and 12(24%) were females.

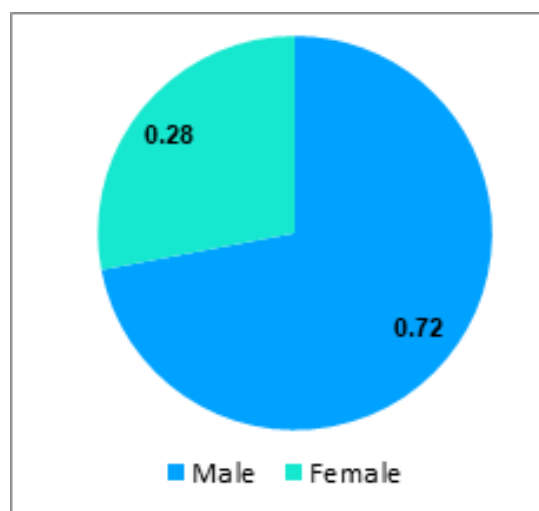


Fig. 1: Sex distribution of study cases

4.3. Manner of death

Table 2 indicates the manner of death in suicide and non suicide deaths cases with, 32 (64%) were of hanging, 17 of poisoning, 1 case of burns and 31 (62%) were of accidents, 18 of natural deaths, 1 case of homicide respectively.

4.4. Morphological analysis

4.5. Weight

The weight of pancreas (grams) in study and control cases as shown in Table 3. In study cases maximum weight is 78.2 grams and minimum is 67.3 grams. In control cases maximum weight is 78.2 grams and minimum is 65.5 grams. The mean weight of the pancreas in the suicidal group was

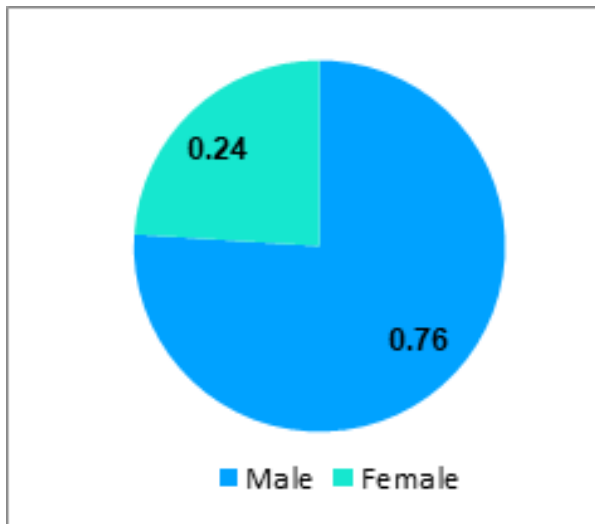


Fig. 2: Sex distribution of control cases

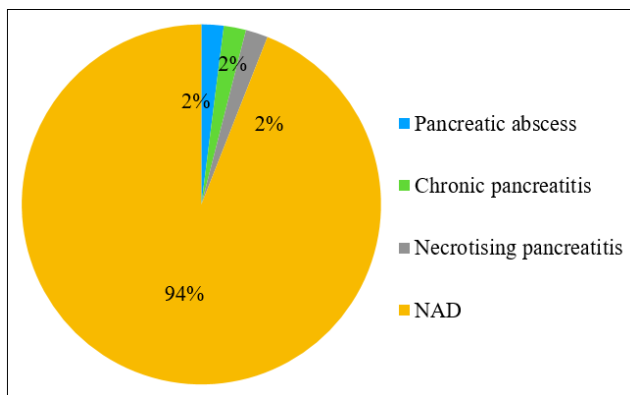


Fig. 3: Histopathological finding in pancreas

71.27 grams and the standard deviation was 2.18 grams, whereas the mean weight of the pituitary gland in the non-suicidal group was 70.87 grams and the standard deviation was 2.63 grams (Table 3). The P value comes out to be 0.41, which is more than 0.05, so there was no significant difference between the weight of the pancreas in the suicidal and the non-suicidal group.

4.6. Histopathological changes in thyroid gland

Of the total 100 cases, only three (3%) revealed significant pathological findings and the rest 97 (97%) were histologically normal (Table 4 & Figure 3). In the study group there was one case each of pancreatic abscess, and necrotising pancreatitis. Pancreatitis abscess was diagnosed when the histology revealed focus of necrosis of the pancreatic parenchyma with dense neutrophilic infiltration. Necrotising pancreatitis (Figure 5) showed extensive necrotising inflammation of the pancreatic parenchyma. In the control group there was only 1 case (2%), of

chronic pancreatitis. Chronic pancreatitis (Figure 6) was labelled when fibrosis of the pancreatic parenchyma with mild lymphomononuclear cell infiltration. So, pathological findings were twice as common in the suicidal group as compared to the non-suicidal group.



Fig. 4: Showing normal pancreas

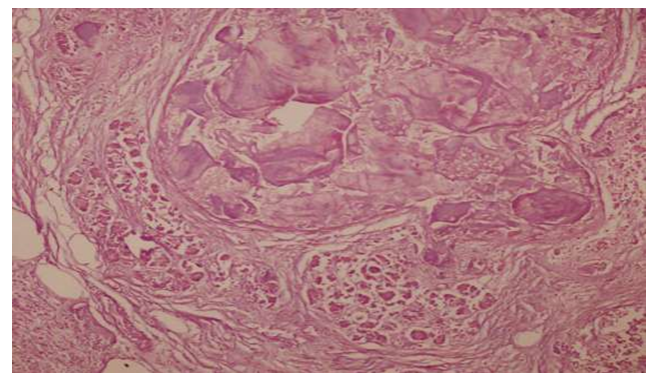


Fig. 5: Photomicrograph showing necrotising pancreatitis with extensive necrotising inflammation of the pancreatic parenchyma (H&E, X40).

5. Discussion

In our study, weight of the pancreas was measured and was compared between the two groups: suicidal (mean=71.27, SD=2.18 and $p=0.41$) and non-suicidal (mean=71.87, SD=2.63 and $p=0.41$). But there was no significant difference between the studied groups.

In the present study, of the 50 cases of suicide, only 1 case (2%) had pathological changes of pancreatic abscess and 1 case (2%) had changes of necrotising pancreatitis. Out of 50 non suicidal cases, only 1 case (2%) was diagnosed as chronic pancreatitis. Our findings are different from the findings of study by Turaga, et al⁹ as he conducted his study on suicide in patients of pancreatic cancer. They concluded that there is overall increased risk of suicide among patients with pancreatic adenocarcinoma.

Table 1: Age wise distribution of cases

Age Group	Suicide Cases	Percentage	Non-suicide Cases	Percentage
11-20 yrs	10	20%	6	12%
21-30 yrs	15	30%	9	18%
31-40 yrs	10	20%	9	18%
41-50 yrs	7	14%	12	24%
51-60 yrs	5	10%	7	14%
61-70 yrs	3	6%	4	8%
71-80 yrs	0	0	2	4%
81-90 yrs	0	0	1	2%

Table 2: Manner wise distribution

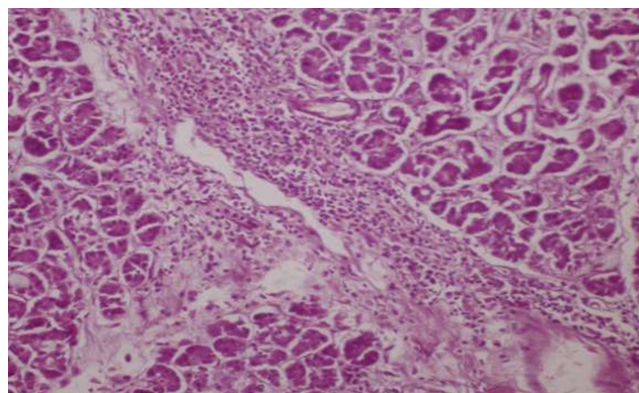
Manner	N	Mean	Std. Deviation	P value
Suicidal	50	34.56	14.60	0.01
Non-Suicidal	50	42.82	17.43	

Table 3: Weight of pancreas gland

Pancreas weight (gms)	N	Mean	Std. Deviation	P value
Suicidal	50	71.27	2.18	0.41
Non-Suicidal	50	70.87	2.63	

Table 4: Histopathological diagnosis in pancreas in both study and control cases

Histological diagnosis	Study case/Control Case	Percentages of cases
Pancreatic abscess	Study case	1 (2%)
Chronic Pancreatitis	Control case	1 (2%)
Necrotising Pancreatitis	Study case	1 (2%)

**Fig. 6:** Photomicrograph showing chronic pancreatitis with fibrosis of the pancreatic parenchyma with lymphomononuclear cell infiltration (H&E, X200).

6. Conclusion

This study was undertaken in the department of Forensic medicine and Toxicology in collaboration with the department of Pathology, GMCH, Chandigarh.

1. Maximum number of cases about 30% in suicide death group was observed in age group 21-30 yrs.
2. Maximum number of cases about 24% in non suicide death group was observed in age group 41-50 yrs.

3. There is no significant variation pancreatic gland in both suicide and non-suicide group
4. In 4% cases revealed pancreatic abscess and necrotising pancreatitis in suicide group whereas only 2% cases showed chronic pancreatitis in the non suicide group. Thus, pathological findings were twice as common in the suicidal group as compared to the non-suicidal group.

There are very few studies that relates the changes both in weight and histopathological in pancreas. The correlation between changes in pancreas and suicide tendency needs further researched. But in this study we tried to find such a correlation.

7. Conflict of Interest

None.

8. Source of Funding

None.

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