

ORIGINAL RESEARCH

Drain fluid amylase in pancreatic surgeries as a predictor for early drain removal and associated complications**Abhijit Patra¹, Jishan Ahmed², Siddhartha Sankar Konwar³**

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ABSTRACT

Background: Diagnostic accuracy of drain fluid amylase as a triage test for the detection of clinically significant pancreatic leaks, so that an informed decision can be made as to whether the patient with a suspected pancreatic leak needs further investigations, treatment and also a predictor for early drain removal and help in enhanced recovery after surgery. **Aims And Objective:** To analyze the drain fluid amylase (DFA) on the 3rd Post-operative day (POD) as a predictor for early drain removal and its associated complications. **Methodology:** Patients admitted to our hospital and after a detailed history and investigations those who were diagnosed with carcinoma head of the pancreas, periampullary carcinoma, chronic pancreatitis, and underwent pancreatoduodenectomy and Lateral pancreaticojejunostomy patients were analyzed prospectively. Twenty cases were taken into the study. DFA analysis was done on Day 1 and Day 3. Those patients without drains or POD 1 DFA >5000 U/L were excluded. Patients with POD 1 DFA <5000 U/L were divided into groups based on POD 3 DFA: Group A (<350 U/L) and Group B (>350 U/L). Analysis of postoperative pancreatic fistula, bile leak, chyle leak, enteric leak, length of hospital stay, and readmission was done. **Results:** Among 20 patients in the database. Patients with POD 1 DFA <5000 U/L, Group A on POD 3 DFA <350 U/L (12 cases) & Group B with DFA >350 U/L (8 cases). Complications like Postoperative pancreatic fistula, bile leak, chyle leak, and length of hospital stay were more in Group B with a p-value <0.05. **Conclusion:** Patients with POD 1 < DFA 5000 U/L, and POD 3 DFA < 350 U/L had been good predictor's early drain removal with minimal complications.

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INTRODUCTION

In pancreatic surgery, Even though intra-abdominal drains act as a warning of anastomotic leak and hemorrhage, the risk of infection and the potential damage that may be induced by mechanical pressure, erosion, or suction led to their role being questioned.¹ Postoperative pancreatic fistula (POPF) remains a major cause of morbidity; it has a reported incidence of 35 percent and can lead to intra-abdominal collections, subsequent infection with sepsis, and even death.² The principle of postoperative drainage remains constant, it is of

paramount importance to understand what is the effect of drain placement on morbidity rates¹. Postoperative monitoring of drain fluid amylase (DFA) levels to detect pancreatic fistula has been a routine practice among pancreatic surgeons. A few studies have shown that estimation of the first postoperative day (POD1) DFA can identify patients at low risk of POPF following pancreatoduodenectomy and facilitate early drain removal.^{3,4} The resulting leakage of pancreatic effluent can lead to significant morbidity characterized by deep organ space infection, hemorrhage, end-organ failure, and even death.⁵ The International Study Group on Pancreatic Fistula (ISGPF) offers the most accepted definition of POPF: amylase level in the drain fluid greater than three times the upper normal serum value on or after the third postoperative day (POD)^{6,5}. Three different grades (A, B, and C) of pancreatic fistula have been defined based on the patient's appearance, need for parental nutrition and/or drainage, and potential for reoperation. Patients with a mild, or Grade A, pancreatic fistula often appear well and require no intervention. Grade B pancreatic fistulas occur in patients who generally appear well, but may require parenteral nutrition or fistula drainage for the fistula to heal. The most severe form are Grade C fistulas, in which patients appear ill and require parenteral nutrition, interventional drainage, and potentially even reoperation for treatment.⁵ The development of a pancreatic fistula is associated with longer hospital stays, but most patients can be treated effectively without the need for additional surgery.⁷ Enhanced recovery after surgery (ERAS) protocols have resulted in a substantial reduction in complications for several abdominal operations. Early removal of intra-abdominal drains is a key element of ERAS protocols.⁸

AIMS AND OBJECTIVES

To analyze the drain fluid amylase on 3rd Post-operative day (POD) as a predictor for early drain removal and its associated complications.

METHODS

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| Place of Study | – Department of General Surgery, Assam Medical College and Hospital. |
| Duration of Study | – August 2021 to March 2022 |
| Type of Study | – Hospital-based prospective study |
| Study Population | – Patients underwent pancreatic surgeries like pancreatoduodenectomy, Lateral pancreaticojejunostomy |
| Sample Size | – 20 |
| Selection of Case | – The patient underwent pancreatic surgeries with POD 1 Drain fluid amylase <5000 U/L and was distributed in 2 groups based on DFA <350 U/L on DAY 3 and DFA >350 U/L on DAY 3. The cut-off data of 350 U/L was selected on the meta-analysis of Giglio et al ² |

Inclusion Criteria:

- The patient which has provided consent.
- The patient underwent pancreatic surgeries with drain placement.

Exclusion Criteria:

- DFA on POD 1 >5000 U/L
- Patients with no drain placement.
- Patients who have not given consent.

Statistical Analysis: The statistical data analysis was performed using the computer program statistical package for social sciences (SPSS for windows version 20.0. Chicago, SPSS Inc.) and Microsoft excel 2010. Results on continuous measurement are presented as mean ± Standard deviation and are compared using the student t-test. Discrete data are expressed as

numbers (%) and are analysed using the chi-square test and Fischer's exact test (where the cell count was <5 or 0). The statistical significance was fixed for all analyses at a 5% level (p-value <0.05).

RESULTS

Among the 20 patients who went pancreatic surgeries in our institution had intraperitoneal drains placed at the time of surgeries and had both POD 1 & POD 3 Drain fluid amylase [DFA] data available. Among the 20 patients, 12 patients with POD 3 DFA <350 U/L (Group A) and 8 patients with POD 3 DFA >350 U/L were categorized in group B.

TABLE 1: DEMOGRAPHIC CHARACTERISTICS

	GROUP A [DAY 3 DFA <350U/L] N- 12	GROUP B [DAY 3 DFA >350U/L] N-8
AGE	60 [50-70]	60 [50-70]
GENDER		
MALE	7(58%)	7(87%)
FEMALE	5(41%)	1(12.5%)

TABLE 2: COMORBIDITIES

COMORBIDITIES	GROUP A [DAY 3 DFA <350U/L] N- 12	GROUP B [DAY 3 DFA >350U/L] N-8
HTN	2(16%)	5(62%)
COPD	2(16%)	6(75%)
PVD	1(8%)	4(50%)
DIABETES	2(16%)	6(75%)

Table 1 & 2 displays the baseline characteristics of the study population. There was no significant difference in age, sex, gender, ethnicity, distribution of comorbidities between Group A & Group B

TABLE 3: DIAGNOSTIC CHARACTERISTICS

DIAGNOSIS	GROUP A [DAY 3 DFA <350U/L] N- 12	GROUP B [DAY 3 DFA >350U/L] N-8
PDAC	3(25%)	7(87.5%)
AMPULLARY CANCER	9(75%)	1(12.5%)
PANCREATITIS	6(50%)	1(12.5%)

TABLE 4: COMPLICATIONS WITH MORBIDITY

COMPLICATIONS	GROUP A [DAY 3 DFA <350U/L] N- 12	GROUP B [DAY 3 DFA >350U/L] N-8	p-value
POPF	7(58%)	8(100%)	<0.05
BILE LEAK	1(8%)	4(50%)	0.035*
ENTERIC LEAK	2(16%)	5(62.5%)	<0.05
CHYLE LEAK	0	2(25%)	<0.001*
LENGTH OF STAY	10-12 DAYS	20-30 DAYS	<0.001**
READMISSION	3(25%)	6(75%)	0.028*

Morbidity was greater in Group B, complications of any grade were more frequent in Group

B. POPF was more frequent in Group B which is 100%, Bile leak was noted approximately 50% in group B as compared to Group A which is 8%, Enteric leak was noted approximately 62.5% which comes out to be statistically significant with p-value <0.05

The length of hospital stay and the readmission were significantly more in the Group B with statistically significant p-value.

TABLE 5: TIMING OF DRAIN REMOVAL

GROUP A N=12 [DAY 3 DFA <350U/L]	EARLY DRAIN REMOVAL [<5 DAYS] N = 4	LATE DRAIN REMOVAL [>5 DAYS] N=8	p-value
POSTOPERATIVE PANCREATIC FISTULA	1 (25%)	6(75%)	<0.05
INTRA-ABDOMINAL ABSCESS	0	4 (50%)	<0.05
GROUP B N=8 [DAY 3 DFA >350U/L]	EARLY DRAIN REMOVAL [<5 DAYS] N = 0	LATE DRAIN REMOVAL [>5 DAYS] N=8	p-value
POSTOPERATIVE PANCREATIC FISTULA	0	8 (100%)	<0.05
INTRAABDOMINAL ABSCESS	0	4 (57%)	<0.05

Data on the timing of drain removal was available for 20 patients. In Group A early drain removal (< 5 days) was 33%, with and Late drain removal (> 5 days) was 67%. In the late drain removal group cases of POPF was around 75% and intraabdominal abscess of 50% . Whereas in group B all are late drain removal. Morbidity was more late drain removal.

DISCUSSION

POPF remains the major concerns for many pancreatic surgeries. Patients with early drain removal and DFA <350U/L has low risk of morbidities and complications. In the study of M. C. Giglio, D. R. C. Spalding concluded that Evaluation of drain amylase content highly accurate in predicting POPF following major pancreatic resection. It may allow early drain removal and institution of an enhanced recovery pathway.² In study Nicole Villafane-Ferriol, George Van Buren II has concluded that POD 3 DFA <350 may be a practical test to guide safe early drain removal and decreases the incidence of associated complications.⁹ In study of Claudio Bassi, Enrico Molinari, also stated that In patients at low risk of pancreatic fistula, intra-abdominal drains can be safely removed on POD 3 after standard pancreatic resections. A prolonged period of drain insertion is associated with a higher rate of postoperative complications with increased hospital stay and costs.¹ In the study of Menghua Dai, has concluded that early drain removal could reduce the incidence of major complications in patients undergoing Pancreatic surgeries.

CONCLUSION

Patients with POD 1 < DFA 5000 U/L, and POD 3 DFA < 350 U/L had been a good predictor for early drain removal with minimal complications.

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