The PFD Test for Pancreatic Disease Patients

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The PFD test was performed on various pancreatic disease patients. The urinary PABA excretion rate was significantly lower in chronic pancreatitis patients and in pancreatic carcinoma patients than in the controls, but no difference was observed between PABA excretion in the two diseases. After surgery, PABA excretion values of pancreatic carcinoma patients were significantly lower than those of non-pancreatitis non-pancreatic carcinoma patients. This was thought to be caused by the difference in residual anastomosed pancreatic tissues. Mild to severe pancreatitis, fibrosis and/or fat necrosis were seen in the pancreatic tissues of carcinoma patients, but these changes were minimal in non-pancreatitis non-pancreatic carcinoma patients. The PFD test is useful in detecting decreases in pancreatic exocrine functions or measuring the grade of pancreatic disorders in various pancreatic diseases, although it can not be used to differentiate pancreatic diseases.

(Key Words: The PFD Test, Pancreatic Surgery, Pancreatic Exocrine Function, Pancreatic Carcinoma, Chronic Pancreatitis)

INTRODUCTION

PFD tests were performed on patients with various pancreatic diseases before and after surgery.

MATERIALS AND METHODS

I Pancreatic carcinoma patients
a. Six patients, 53 to 70 years old, four males and two females, underwent the PFD test. One to two months after total pancreatectomy, the PFD test was performed on two out of the six patients.
b. Twenty-four days to six months after surgery (Child's or Whipple's procedure), three patients, 48 to 70 years old, two males and one female, underwent the PFD test.

II Chronic pancreatitis patients
a. Eight patients, 32 to 70 years old, six males and two females, underwent the PFD test. Four out of the eight were treated surgically. One half to seven months after surgery, the PFD test was performed on the four.
b. In addition, a 46-year-old male was studied twice, one half month and five months after surgery. Preoperative PFD tests had not been performed.

The diagnoses “chronic pancreatitis” were established during surgery.
or by endoscopic retrograde cholangiopancreatography (ERCP).

III  Patients with other disorders
a. Three patients, 19 to 56 years old, one male and two females, underwent pancreatic surgery (Child's or Whipple's procedure) because of pancreatic ruptures due to an accident or pancreatic head fibrosis due to common bile duct stones. One to nine and half months after surgery, they were examined by the PFD test.
b. A 56-year-old female with periampula carcinoma and a 43-year-old male with common bile duct carcinoma were studied before and four months after surgery (Child's procedure).

The PFD test was performed in the same way as described in our previous paper. All drugs were discontinued at least 12 hours before the investigation. After overnight fasting, test material (B.T. PABA 1 gm) with test meal (OKUNOS A) was administered orally at 9:00 AM. Urine was collected for 6 hours after ingestion of the test material and test meal. Subjects were allowed to drink water at will after 10:00 AM to ensure sufficient diuresis. P-aminobenzoic acid (PABA) in the collected urine was determined by the Bratton-Marshall method as modified by Smith et al. (3)

![Fig. 1](image-url)  
**Fig. 1**  PABA excretion values before and after pancreatic surgery.
After surgery, PABA excretion decreased.
- : pancreatic carcinoma patients
- : other carcinoma patients
- : total pancreatectomy
- : Child's or Whipple's procedure
RESULTS

I Pancreatic carcinoma patients

The preoperative PABA excretion rate of the six patients was 50 ± 13% (M ± S.D.) and their mean age was 64 ± 6 (M ± S.D.). PABA excretion values of the two patients after total pancreatectomy were excessively low (five per cent and 13 per cent). PABA excretion values of the three patients (mean age: 56 ± 12) after Child's or Whipple's procedure were 15 ± 4% (M ± S.D.). (See Fig. 1.)

II Chronic pancreatitis patients

PABA excretion values of the eight patients before surgery were 52 ± 17% (M ± S.D.) and the mean age was 50 ± 12 (M ± S.D.). After surgery, PABA excretion of the three patients became low. In the follow-up study, PABA excretion of two of them showed recovery with time. (See Fig. 2)

III Patients with other disorders

After surgery, PABA excretion values of the five patients were 43 ± 12% (M ± S.D.) which was significantly higher than those of three carcinoma patients. (See Figs. 1 and 2.)

Fig. 2  PABA excretion values before and after surgery
PABA excretion in chronic pancreatitis patients showed recovery with time.

○ : chronic pancreatitis patients
○ : other pancreatic disorders
□ : Child's or Whipple's procedure
□: other miscellaneous procedures
IV Light-microscopic findings

Pancreas tissues resected during surgery were examined light microscopically. Mild to severe changes such as fat necrosis, fibrosis and/or pancreatitis were seen in the carcinoma-free tissues of the carcinoma patients. However, residual anastomosed tissues of the five patients with other disorders were kept intact from injury, tumor invasion and fibrosis.

COMMENTS

The PABA excretion rate in normal controls under 70 years of age was more than 70 per cent (3). In this study, PABA excretion values of six pancreatic carcinoma patients were significantly lower than those of controls which means that pancreatic exocrine functions decreased in the carcinoma patients. Similar results were obtained and reported in many papers using the conventional secretion-pancreozymin test or PFD test (1, 2, 4).

PABA excretion values of the eight chronic pancreatitis patients were also significantly lower than those of controls, but no statistically significant difference was observed between the PABA excretion rates in chronic pancreatitis patients and in carcinoma patients. It has been reported that decreased PABA excretion is observed in chronic pancreatitis patients who have two or more decreased factors in the secretin-pancreozymin test or have moderately to severely changed pancreatic ducts in ERCP (2, 3).

There seemed to be differences in the PABA excretion values with different surgical procedures. The PABA excretion rate in total pancreatectomy patients did not decrease to zero per cent although pancreatic juice did not exist throughout the gastrointestinal tract. This contradiction is assumed to be caused by the influence of digestive drugs administered for pancreatic replacement therapy, the chemical functions of intestinal bacterial flora and other unknown factors (5).

After pancreatic surgery, PABA excretion values of pancreatic carcinoma patients were significantly lower than those of non-pancreatitis and non-carcinoma patients although they were treated by the same surgical procedures. This was thought to be caused by differences in residual anastomosed pancreatic tissues. Residual pancreatic tissue of carcinoma patients showed pancreatitis, fibrosis and fat necrosis which are thought to be etiological conditions. However, these changes were minimal in non-pancreatitis non-pancreatic carcinoma patients (1). In conclusion, the PFD test is useful in detecting the decrease of pancreatic excretion or in measuring the grade of pancreatic disorders in various pancreatic diseases and it can also be used in follow-up studies after pancreatic surgery.

REFERENCES