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## Palliative Bilio-Digestive Anastomosis for the Treatment of Bile Duct Obstruction Due to Pancreatic Head Tumors: Techniques and Therapeutic Results

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### Abstract

**Introduction:** Biliary-digestive anastomosis are a fistulization between the bile ducts and the digestive tract that aims at permanent drainage of bile to the digestive tract in case of obstruction at the lower bile duct.

The objective of our study was to describe the main techniques and postoperative results of biliary-digestive anastomoses in the treatment of pancreatic head tumors in the visceral surgery department of the Donka national hospital.

**Material and Methods:** This is a descriptive cross-sectional study for 5 years duration from January 01, 2014 to December 31, 2019 which focused on the records of patients who underwent bilio-digestive anastomosis for pancreatic head tumors.

**Results:** The frequency of biliary-digestive anastomosis was 0.38% (N=24). The mean age was 43.75 years with a male predominance of 54.17% (n=13): sex ratio 1.18. The clinical picture was dominated by jaundice, dark urine and stool discoloration in all cases. Abdominal Computed Tomographic (CT) scan and Ultrasound (US) were the reference examinations. The indications were tumors of the head of the pancreas 100% (n=24). The approach was median supra-umbilical in all cases. The types of anastomosis were dominated by choledochodenal anastomosis 54.16% (n=13) followed by cholecysto-jejunal 20.83% (n=5) and choledoco-

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jejunal 16.67% (n=4). The postoperative course was simple in 56% (n=14). Morbidity was 20% (parietal suppuration 12%, anastomotic biliary leakage 8%), and postoperative mortality 24% (n=6). The average hospital stay was 12.70 days.

**Conclusion:** Due to the lack of endoscopic and angiographic methods for biliary drainage in our hospital, the bilio-digestive anastomosis keep their place in the palliative treatment of the tumors of the head of the pancreas in our context of practice.

## Keywords

Bilio-Digestive Anastomoses; Pancreas Tumors; Techniques; Visceral Surgery

## Introduction

The Biliary-Digestive Anastomosis (BDA) or internal biliary drainage is a fistulization between the external bile ducts (gallbladder, common bile duct) and the gastrointestinal tract (duodenum, jejunum) that aims at permanent drainage of bile to the gastrointestinal tract in case of obstruction of the lower bile duct and evacuation of any residual lithiasis of the main bile duct [1,2]. This surgical technique is indicated in abdominal pathologies preventing biliary drainage (cancer of the head of the pancreas, lithiasis of the main bile duct, cancer of the main bile ducts) [2-4]. Our study focuses on the indication of presumed malignant tumors of the pancreatic head. Surgical treatment is classical; next to that, endoscopy and interventional radiology are unconditional alternatives in some countries [ 5].

The methods of surgical biliary-digestive diversions are numerous and include cholecystoduodenostomy, cholecystojejunostomy or choledocoduodenostomy [1]. The results of these different methods of anastomosis vary depending on the biliary plane used. The perioperative mortality and morbidity rates of anastomosis to the gallbladder are respectively 25 and 17% in the literature [1,2].

The frequencies of anastomoses vary according to the publications: Sidibe, et al., in 2018 in their study on bilio-digestive shunts in palliative surgery for pancreatic head cancer reported 78 out of 152 cases of bilio-digestive shunts for pancreatic head cancer with a mortality of 6.41% in the immediate postoperative period [6]. In Guinea, Diallo in 2006 reported 11 cases (30.56%) of bilio-digestive bypass for 9 cases of pancreatic head tumor, 1 case of pancreatic cyst and 1 case of bile duct cyst [7].

Given the constraints of better management, does Bilio-Digestive anastomosis still have a place in the management of pancreatic head tumors in our practice setting? What are the main techniques for these types of anastomosis? What are the postoperative complications?

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Herein, we present our experience with Bilio-Digestive anastomosis as a palliative management of pancreatic head tumors.

## Methods

This is a cross-sectional study of descriptive type with a duration of 5 years from 01 January 2014 to 31 December 2019. It concerned the files of patients who had received a bilio-digestive anastomosis at the visceral surgery department of the Donka national hospital for tumor indications (presumed malignant tumors of the head of the pancreas) regardless of age, sex. We excluded incomplete files.

We proceeded to an exhaustive recruitment of all the files of the patients admitted and having benefited from a bilio-digestive anastomosis at the visceral surgery department of the Donka national hospital. Our variables were sociodemographic, diagnostic, therapeutic and evolutionary.

The sociodemographic characteristics were: frequency, age, sex.

The elements of diagnostic decision were clinical and paraclinical:

Clinical: Functional signs of call (pain in the right hypochondrium, Icterus, discolored stools, dark urine) of bilio-pancreatic pathology.

- Physical signs with their characteristics (pruritus). Comorbidities and antecedents were sought.

Complementary examinations were requested for diagnostic purposes (ultrasound and abdominal CT scan) and to explore the field (blood count, total, direct and indirect bilirubin, transaminases (Aspartate aminotransferase ASAT and Alanine aminotransferase ALAT), creatinemia, alkaline phosphatases).

The therapeutic management was exclusively surgical. The parameters studied were:

- The macroscopic characteristics of the presumed malignant tumors of the head of the pancreas (hard consistency, very irregular edges and surfaces, presence of regional adenopathy of the hepatic pedicle).

The data from the pre-anesthetic consultation allowed us to describe the general condition of the patients by the American Society of Anesthesiology (ASA) classification:

- ASA I: Patient in good health
- ASA II: Patient with moderate general pathology (moderate hypertension, moderate anemia)
- ASA III: Patient with a severe general pathology (severe hypertension, diabetes)

- ASA IV: Patient with a disabling pathology engaging the vital prognosis (chronic renal, cardiac and hepatic insufficiency)
- ASA V: Moribund patient

The approach was in all cases median above median.

The type of biliary-digestive anastomosis: the DBA is performed between the extra-hepatic bile ducts (gallbladder, bile duct, hepatic ducts) and a digestive side (duodenum, jejunum).

The main methods of BDA performed depended on the intraoperative lesions responsible for the blockage of biliary drainage: a principle cholecystectomy was performed before an anastomosis on the main bile duct.

- A choledochodenal: the choledochotomy was in all cases transverse. A longitudinal duodenotomy at the upper border of the first duodenum was performed. For a latero-lateral anastomosis, the common bile duct was incised transversely. Both ends of the incision are mounted on guide wires. The anastomosis can also be terminal-lateral. The distal choledochial stump is either tied or closed with a slow absorbable suture
- A cholecystojejunal: it can be performed on an omega loop or on a "Y" loop according to Roux. Generally the preference is for the excluded loop, as it reduces the risk of angiocholitis. The cholecysto-jejunal anastomosis is either lateral or terminal
- A choledocojejunal with a Y-shaped loop according to Roux. The anastomosis can be lateral or terminal on a Y loop, this loop is mounted pre-colonically or trans-mesocolonically depending on local conditions. A transverse incision is made on the common bile duct, and marker lines are placed at the ends of the incision. The jejunal incision is longitudinal at about 5 cm from the blind end of the excluded loop

The evaluation of patients who underwent a biliary-digestive anastomosis was clinical and biological. The data studied were the resumption of the transit, the disappearance of all the clinical and biological signs of the blockage of the biliary drainage. We distinguished:

- Simple sequelae defined by regression of clinical signs and primary parietal healing
- Complicated sequelae defined by the occurrence of morbid factors leading to complications and, in extreme cases, death

The data collected during our study were analyzed using Epi-info 7.2 and SPSS version 21 software.

## Results

Frequency of biliary-digestive anastomoses compared to other surgical procedures: 0.38% (n=24) N=6245.

The average age was 43.75 years with extremes of 15 and 84 years. The age group 55-64 years was the most affected by DBA, 32% (n=8). The sex ratio (male/female) was 1.18 with a male predominance of 54.17% (n=13).

Clinical Signs	Number of cases	Percentage
Jaundice	24	100
Stool discoloration	24	100
Dark urine	24	100
Pruritus	17	70.83
Right hypochondrium pain	12	50
Alteration of general condition	11	45.83

**Table 1:** Frequency of clinical signs (N=24).

Type of Anastomosis	Number of Cases	Percentage
Choledochodenal	13	54.16
Cholecysto-jejunal	5	20.83
Choledoch-jejunal	4	16.67
Cholecojejunal with Y-ring/ROUX	2	8.33
Total	24	100

**Table 2:** Distribution of cases by type of anastomosis.

The comorbidities (n=9) were: arterial hypertension (33,33% n=3), Diabetes +: arterial hypertension (44,44% n=4), Hepatitis B virus (11,11% n=1), Human immunodeficiency virus HIV (11,11% n=1)

Alcohol and tobacco intoxication was noted in 20% (n=2) of cases.

The ultrasound findings were:

- A mass image of the head of the pancreas plus dilatation of the intra and extra hepatic bile ducts and the Wirsung canal in 78.95% (n=15).

Dilatation of the intra- and extra-hepatic bile ducts without visualized obstacle: 21.05% (n=4).

Abdominal computed tomography (CT) data (n=5) were:

- A pancreatic tumor + cholestasis (n=2, 40%)
- Cystic tumor of the pancreas (n=2, 40%)
- A tumor of the head of the pancreas + lymph node invasion of the hepatic pedicle (n= 1, 20%)

The results of the biological examinations were:

Leukocytosis (>10G/L): 12 (50%), Hemoglobin (<8g /l): 2 (8.33%)

Blood glucose (>6.1mmol/l): 3 (12.5%), Total bilirubin (>17mmo/l): 2 (8.33%)

Elevated alkaline phosphatases (>30-125IU/L): 2 (8.33%), Elevated transaminases (>0.75ukat): 1 (4.17%), Elevated creatinemia (>88mmol /l): 1 (4.17%)

Positive retroviral serology: 1 (4.17%), Positive hepatitis B antigen: 1 (4.17%)

The indications for DBA were pancreatic head tumors in 100% (n=24)

The American Society of Anesthesiology (ASA) classification was divided as follows:

ASAI : ( n=19, 79,16%) , ASAII : (n=4, 16,67%) , ASAIII :( n=2 , 8,33% )

The median supra umbilical approach was the only one used in all our patients.

The biliary-digestive anastomoses were distributed as follows:

The choledochoduodenal anastomosis was latero-lateral in 92.86% (n=13) of the cases and the cholecysto-jejunal anastomosis was latero-lateral in 60% (n=3) patients and termino-lateral in 40% (n=2) of the patients.

The choledocho-jejunal anastomosis, latero-lateral and termino-lateral were performed in 4 patients, i.e. 50% each of the 2 methods.

The postoperative course was simple in 56% (n=14). The complications were: parietal suppuration in 12% (n=3), anastomotic biliary leakage in 8% (n=2). The case fatality rate was 24% (n=6).

The main probable causes of death (n=6) were:

- Hypovolemic shock in 71.42% (n=4)
- Septic shock in 14.28% (n=1)
- Hepatic encephalopathy (n=1, 14.28%)

The average length of hospital stay was 12.70 days with extremes of 7 days and 24 days.

## Discussion

Bilio-Digestive anastomosis are multiple and varied according to the digestive and biliary segments. They are more frequently used in pancreatic tumor pathologies in our context. Endoscopic alternatives and interventional radiology are not available in our country unlike Maire, et al., in France who in 2013, performed a comparative study of the methods of performing Bilio-Digestive anastomosis: endoscopy or surgery? [5]. The success rate of biliary and duodenal stenting is over 90% with low morbidity. Numerous studies have compared endoscopic and surgical treatment, with an advantage to endoscopic treatment in terms of quality of life and cost [5].

During our study we collected 24 cases of biliary-digestive anastomoses. Our result is close to that of Imorou Souaibou, et al., in Benin in 2018 who reported 31 cases (68.9%) of bilio-digestive bypass [3]. It is lower than that of Sidibé, et al., who recorded 78 cases of biliodigestive shunts in Mali in 2018 [6]. The patients were mostly young adults with a mean age of 43.75 years with male predominance. This result is contrary to that reported by Sidibé, et al., in Mali who noted a mean age of  $58.61 \pm 11.22$  years [6]. The male predominance found in our study is reported in the literature [2-6].

The risk factors for malignant tumors of the pancreas were alcohol intoxication, diabetes, and arterial hypertension as reported in the literature [3-6].

The diagnostic decision parameters for the indications of DBA were related to the clinical hepatobiliary and pancreatic examination data. Clinical signs related to pancreatic head tumors were dominated by cholestasis (jaundice, pruritus), epigastric pain and weight loss as reported in the literature [3,4,8]. Jaundice, as a consequence of tumor compression or lithiasis of the main bile duct, remains the main symptom justifying the indication of surgical DBA [1,2]. Jaundice was rapidly disabling due to the associated pruritus and required removal of the obstruction as soon as possible [1,2]. The same findings were made by Bouglouga in Togo in 2015 and Sidibé in Mali in 2018 [6,9].

Abdominal ultrasound and abdominal CT were the reference examinations in our study to confirm the operative indications (tumors of the head of the pancreas). Abdominal CT is the reference examination for the diagnosis of pancreatic tumors with a sensitivity of 90%, the search for distant metastases, and the assessment of resectability [2,10]. This examination is of limited access in our context of practice because of its high cost compared to the low socio-economic level of the Guinean population. In our study, abdominal CT could only be performed in 5 cases and allowed the diagnosis of pancreatic head tumor in 4 cases each (40%). Abdominal ultrasound, which is more accessible and less invasive, is the first-line examination in our health facilities. In our study, it allowed the detection of a tumor of the head of the pancreas in 20 cases. Ultrasound is the first-line examination that allows clear visualization of liver metastases [2,10,11]. However, it is not sensitive for tumors smaller than 15 mm [10]. The main indications were tumors of the pancreatic head (96% n= 24). The original pancreatic



tumor found in our study is reported in the literature [1-4,6,8,9]. In our study, these were pancreatic tumors of hard consistency with lymph node extension of the hepatic pedicle and liver metastasis, not resectable. We did not perform biopsies, contrary to the study by Sidibé, in Mali who reported 59 cases of biopsies alone without derivations [6]. Indeed, given its local or general extension, curative removal of the pancreatic tumor is only possible in 20% of cases (1 in 5 patients) at the time of diagnosis [1,2,6,12]. In the other cases (80%), palliative surgical DBA of progressive complications (jaundice, pruritus, duodenal obstruction, pain) aims at restoring quality of survival to the patients [1,2,4,5]. In our hospital endoscopic treatment and interventional radiology are not available. Therefore, the only possible treatment is palliative surgery.

From the point of view of surgical approach, supra-umbilical median laparotomy was the only route performed in all our patients. This result corroborates the data in the literature [3,6,9,13]. The right sub-costal approach extended to the left is considered to be the most classic in certain series [1,2]. The latter exposes the whole pancreatic gland, gives ideal access to the liver and its pedicle, allows an associated exeresis procedure to be performed at the sub mesocolic level, and also allows better respiratory tolerance and results in fewer ventrations [1,2]. There are numerous methods of surgical biliary-digestive diversions depending on whether they use the main bile duct or the gallbladder on the biliary side, and the duodenum or jejunum on the digestive side [1,2,4,13]. In our study, DBA via choledochoduodenal was the most common (54.16% n=13) followed by cholecystojejunal (20.83% n=5). The frequency of this choledochoduodenal anastomosis can be explained by the combination of its simplicity, its effectiveness and its rapidity of realization [1,2]. It requires a cholecystectomy to facilitate the anastomosis and avoid acute cholecystitis by reflux [2]. However, the Whipple operation or cephalic duodenopancreatectomy, although being a reference operation, we do not perform it in our context due to the precariousness of our technical platform: very insufficient means of resuscitation, very limited biological and scannographic controls and the poor general condition of the patients who are generally admitted at a very late stage of the pancreatic cancer disease. Therefore, we propose a palliative intervention best adapted to their clinical condition.

In case of malignant pancreatic tumor with an upper border, the real risk of rapid tumor invasion of the choledocoduodenum should contraindicate this type of biliary-digestive shunt [2,3,5].

The cholecystojejunal has been practiced because of its simplicity, its rapidity of realization and the absence of surgical dissection (hepatic pedicle and cholecystectomy) in subjects at risk. The main condition is the existence of a permeable cystic duct, favouring a satisfactory cholecysto-duodenal drainage [1,2]. It requires prior per operative cholangiography by gallbladder puncture [1,2]. Our results corroborate those reported by Sidibé, et al., in Mali choledocoduodenal anastomosis plus gastroentero-anstomosis in 85.90% (n=67) and 7 cases of choledocojejunale plus gastroentero-anastomosis [6]. Sacko, et al., noted a predominance of choledocojejunal in 40% (n=18) and cholecystojejunal in 28% (n=15) and choledocoduodenal



in 28% (n=12) [13]. Gastroentero-anastomosis was associated in all cases of DBA unlike our study where it was associated in only 15 cases of DBA. Surgical diversion involves bilio-digestive diversion and gastrojejunal anastomosis respectively [5]. The choice of the types of anastomosis depends on the intraoperative findings related to the indications (presumed malignant tumors of the head of the pancreas in our study), the evolution of the visceral anatomical lesions, and the surgeon's habits [2,3,6,13].

In our study, the complications related to the surgery were dominated by parietal suppuration and anastomotic biliary leakage which required a surgical revision in 8% (n=2) of cases. The parietal suppuration involved only the abdominal wall and not the intra-abdominal cavity. The treatment consisted of daily dressings plus antibiotics according to the isolated germs (*staphylococcus aureus*): amoxicillin-clavulanic acid 1 g every 12 hours with a good clinical evolution. The biliary leak was diagnosed clinically by the persistence of a greenish (biliary) liquid flow through the median wound at D2 postoperatively. An abdominal ultrasound revealed a fluid collection in the abdominal cavity (bilioma?). The patient's vital prognosis was at stake. An emergency surgery with a perioperative resuscitation allowed to confirm and repair this leak by stitches at the level of a choledoco-jejunal anastomosis. The evolution was favorable. The early and quality management of anastomotic biliary fistulas can contribute to decrease their sometimes fatal consequences [2,3]. The cases of death were related in 4 cases to hypovolemic and septic shock and hepatic encephalopathy. Our results are similar to those reported by Sacko in Mali in 2012: 13.3% morbidity (3 cases of bilio-digestive fistulas and 3 cases of evisceration) and 11.1% mortality [13]. The same findings were by Imorou, et al., in Benin in 2018: hemorrhage (19.4%), biliary fistula (6.5%), stenosis of gastrojejunostomy (3.2%) [3]. In terms of results, in BDA using the gallbladder, morbidity and mortality are identical to other techniques. There is a possibility of secondary recurrence of jaundice by invasion of the cystic duct [1,2]. As for BDA using the bile duct, the morbidity is higher in case of jejunal bypass, and there is tumor invasion in case of duodenal bypass [1,2,14]. The early postoperative complications can be of a general nature or related to the surgical procedure. General complications are thromboembolic and cardiorespiratory complications, acute pancreatitis and some forms of jaundice [1,2]. Complications related to surgery are either non-specific (evisceration, intra-abdominal suppuration) or specific to biliary surgery (hemorrhage, external and intra-peritoneal biliary leaks, pancreatic leaks) [2,3,11,13].

## Conclusion

Bilio-digestive anastomosis still have their place mainly in the palliative management of presumed malignant tumors of the pancreas head. They were performed in a relatively young alcoholic-smoking male population. The main methods of biliary-digestive shunts were cholecysto-duodenostomy, cholecysto-jejunostomy and choledoco-duodenostomy. Complications (morbidity) were rare, dominated by infection and mortality was generally

related to septic shock. Early and efficient diagnostic and therapeutic management of pancreatic head tumors could improve the postoperative prognosis of patients who underwent biliary-digestive anastomosis.

## Conflict of Interest

It is stated that there are no conflicts of interest between the proponents and participants in the present work.

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