

Pancreatic Cancer at the Bouaké University Hospital (Côte d'Ivoire): Diagnostic, Therapeutic, and Prognostic Challenges

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Abstract

Background: Pancreatic cancer (PC) is a malignant disease with a dismal prognosis, and its global incidence is steadily rising. In Sub-Saharan Africa, epidemiological data remain scarce. This study aimed to describe the epidemiological, diagnostic, therapeutic, and survival outcomes of PC at the Bouaké University Hospital Center (CHU) in Côte d'Ivoire. **Materials and Methods:** This was a retrospective cohort study conducted over a 10-year period (January 2013 to January 2023) in the Department of General and Digestive Surgery at the Bouaké University Hospital. Inclusion required histopathological/cytological confirmation or a robust cluster of bio-clinical and radiological evidence. Staging was determined according to the TNM system (AJCC, 8th edition) based on pre-operative or per-operative findings. Survival analysis evaluated the median survival from the date of initial diagnosis. **Results:** Thirty cases of PC were compiled over 10 years, accounting for 2.77% of all gastrointestinal tumors (n = 1080). The mean age was 64.6 years, with a slight female predominance (sex ratio = 0.87). Jaundice was the primary reason for admission (86.7%). Abdominal CT scan was performed in 86.7% of cases. The tumor was located in the pancreatic head in 87% of cases. Histopathological confirmation was obtained in 23 patients (77%, all ductal adenocarcinomas), while 7 patients (23%) met presumptive criteria. Advanced stage IV (metastatic) disease predominated (57%, n = 17). Management was surgical in 26 patients (87%), dominated by palliative procedures (65%, n = 17). The remaining 4 non-operated patients received exclusive best supportive care. Early 30-day

postoperative morbidity was 77% ($n = 20/26$), characterized by hemorrhage (47%, $n = 12/26$). The overall mortality rate during follow-up was 37% ($n = 11/30$), with an estimated median survival time after diagnosis of 5.3 months.

Conclusion: At the Bouaké University Hospital, PC is diagnosed at an advanced stage in elderly patients. Limited access to curative treatments, absence of endoscopic ultrasound (EUS), and late presentation account for the low resectability rates and poor survival.

Keywords

Pancreatic Cancer, Pancreaticoduodenectomy, Jaundice, Retrospective Cohort, Côte d'Ivoire

1. Introduction

Pancreatic cancer (PC) represents a major global public health challenge, characterized by a particularly dismal prognosis and a rising incidence. In 2022, estimates reported nearly 511,000 new cases and 467,000 deaths, illustrating an alarming mortality-to-incidence ratio of 0.898. It ranks as the 12th most common cancer but the 7th leading cause of cancer-related mortality worldwide [1]-[3]. Typically a disease of the elderly, the majority of diagnoses occur after the age of 60, with the risk increasing exponentially with age [3]. Histopathologically, pancreatic ductal adenocarcinoma (PDAC) is the most frequent form, accounting for approximately 90% of cases [4].

The clinical presentation of PC is classically late and insidious. Tumors of the pancreatic head, which are by far the most common, usually present with painless, silent cholestatic jaundice. Conversely, body and tail localizations are discovered at even more advanced stages, manifesting as vague abdominal pain, massive weight loss, or signs of metastatic extension. This clinical latency explains why 50% to 60% of patients present with synchronous metastatic disease at initial diagnosis.

Modern diagnostic strategy relies on imaging. While multidetector computed tomography (MDCT) remains the gold standard for assessing vascular resectability, endoscopic ultrasound (EUS) has become essential for precise staging and pre-operative histological confirmation via fine-needle aspiration (FNA) or biopsy.

The prognosis of PC remains the most pejorative of all gastrointestinal malignancies, with a 5-year overall survival rate of less than 10%. In the metastatic setting, the median survival does not exceed 3 to 6 months, and the 5-year survival rate drops below 5%. Developing countries, particularly in Sub-Saharan Africa, face additional barriers: difficulties in accessing healthcare, cultural or economic diagnostic delays, and limited technical infrastructure. Consequently, epidemiological data there remain fragmented. Although previous studies have addressed pancreatic masses at the Bouaké University Hospital, no recent work has been specifically dedicated to pancreatic cancers. The objective of this study was there-

fore to describe the epidemiological, clinical, staging, therapeutic, and survival profile of this pathology in our tertiary referral center.

2. Materials and Methods

2.1. Study Design and Setting

We conducted a descriptive, retrospective cohort study extending over a 10-year period from January 1, 2013, to January 31, 2023. The study took place in the Department of General and Digestive Surgery at the Bouaké University Hospital, a major tertiary referral facility for surgical digestive pathologies in the central region of Côte d'Ivoire.

2.2. Study Population and Diagnostic Criteria

The study population included all patients hospitalized for a primary pancreatic tumor during the study period. To address potential diagnostic misclassification, patients were classified into two groups according to their diagnostic level of evidence:

- **Histological/Cytological Confirmation Group:** Patients with objective histopathological confirmation obtained from a surgical resection specimen, satellite lymph node biopsy, or cytological analysis of ascites fluid [4].
- **Presumptive Diagnostic Group:** Patients without tissue confirmation but presenting a robust cluster of clinical, biochemical, and radiological evidence defined as the simultaneous presence of: cholestatic jaundice, profound performance status impairment (cachexia/anorexia), significantly elevated tumor marker CA19-9 (>37 UI/mL), and a distinct, unambiguous pancreatic mass identified on abdominal CT scan [5].

Incomplete or clinically unusable records were excluded.

2.3. Staging and Resectability Criteria

Tumor staging was determined retrospectively according to the American Joint Committee on Cancer (AJCC) TNM Staging Classification (8th edition). Stage assignments were based on pre-operative multidetector abdominal CT scans or intraoperative surgical findings [6].

Resectable disease (Stages I and II) was defined by the absence of distant metastasis and the absence of tumor contact with the superior mesenteric artery, celiac axis, or common hepatic artery, alongside less than 180° contact with the superior mesenteric vein or portal vein without contour deformity [6] [7].

Locally advanced disease (Stage III) included unresectable non-metastatic tumors showing extensive vascular encasement [7].

Metastatic disease (Stage IV) was defined by the presence of distant secondary involvements [7] [8].

2.4. Variables and Data Collection

Data were extracted using hospitalization registers, medical charts, operative reports, and anesthesia logs. Variables included sociodemographics, medical his-

tory, clinical symptoms, laboratory findings, imaging results, staging parameters, therapeutic pathways, and postoperative events. Long-term follow-up and survival status were completed through direct phone calls to patients or their primary family contact.

2.5. Survival and Statistical Analysis

Data analysis was performed using Epi Info™ software version 7.2.6.0. Quantitative variables were expressed as means $\pm$ standard deviations with ranges, and qualitative variables as frequencies and percentages.

Survival analysis was conducted using the Kaplan-Meier method. The starting date for survival calculations was defined as the date of initial objective diagnosis (date of diagnostic CT scan or tissue sampling). Patients who were alive at the end of the study period or lost to follow-up were censored at the date of their last documented contact. To ensure consistency, survival outcomes are strictly reported as median survival.

For postoperative outcomes, early complications and mortality rates were calculated using a clear denominator consisting solely of patients who underwent surgical intervention ($n = 26$), with a defined early postoperative observation period of 30 days. Overall cohort mortality included deaths from any cause occurring at any time during the entire follow-up period.

3. Results

3.1. Hospital Frequency and Baseline Characteristics

Out of a total of 1080 digestive tumors managed during the study period, 30 cases of pancreatic cancer were identified, representing a hospital prevalence of 2.77%.

The mean age of the patients was 64.6 years (± 10 years; range: 47 - 86 years), with the 67 - 71 age group being the most affected (23%). We noted a slight female predominance with a male-to-female sex ratio of 0.87. More than half of the patients resided in Bouaké (57%). A medical history was reported in 21 patients (70%), dominated by chronic unexplored epigastric pain (43%, $n = 9$), diabetes mellitus (28%, $n = 6$), and arterial hypertension (24%, $n = 5$). Tobacco smoking was the main identified risk factor (46%, $n = 12$), followed by alcohol consumption (31%, $n = 8$) and regular self-medication (23%, $n = 6$).

3.2. Clinical and Paraclinical Presentations

The mean delay between the onset of the first symptom and specialized consultation was 63 days (range: 5 - 95 days). Jaundice was the primary reason for admission (86.7%, $n = 26$), frequently associated with pruritus (83.3%, $n = 25$) and dark urine (76.7%, $n = 23$). Profound decline in general status (cachexia) was objective in 16 patients (53%), and 43% presented with a WHO Performance Status score of 3. On physical examination, excoriations from scratching (76.7%, $n = 23$) and a palpable epigastric mass (53%, $n = 16$) were the most frequent findings.

Biochemically, a biological cholestasis syndrome was consistently present in all

patients, with a mean total bilirubin elevated at 141.9 mg/L. The CA19-9 marker, measured in 18 patients, was systematically higher than the normal threshold of 37 UI/mL (mean: 90.7 UI/mL). Abdominal CT scan, performed in 26 patients (86.7%), corrected and confirmed the macroscopic diagnosis in all cases. Initial abdominal ultrasound (n = 18) was suggestive in only 66.7% of cases. No endoscopic ultrasound could be performed due to structural unavailability.

3.3. Diagnostic Subgroups and Tumor Characteristics

Tissue confirmation was achieved in 23 patients (77.3%), while 7 patients (22.7%) were managed based on presumptive bio-clinical and radiological criteria. Histological analysis was obtained from surgical resection specimens (30%, n = 9), lymph node biopsies (26.7%, n = 8), or cytological analysis of ascites fluid (20%, n = 6). Ductal adenocarcinoma constituted the absolute histopathological form, representing 100% of the confirmed cases (n = 23, or 76.7% of the overall cohort).

The tumor was preferentially located in the head of the pancreas in 86.7% (n = 26) of cases. According to the AJCC TNM 8th edition staging system, metastatic disease (Stage IV) was widely predominant, accounting for 56.7% (n = 17) of patients. Distant secondary involvements were located in the peritoneum (n = 6), liver (n = 5), and umbilicus (Sister Mary Joseph nodule, n = 3). Curative-intent resectable disease (Stages I and II) was found in 30.0% (n = 9) of patients. The remaining 13.3% (n = 4) of patients presented with locally advanced unresectable non-metastatic disease (Stage III).

3.4. Therapeutic Pathways

A total of 26 patients (86.7%) underwent surgical intervention.

Curative-intent resection surgery was performed in 34.6% of the operated cases (n = 9/26), consisting of 5 pancreaticoduodenectomies (Whipple procedure) and 4 distal spleno-pancreatectomies.

Palliative surgery was performed in 65.4% of the operated cases (n = 17/26), consisting primarily of double bilioenteric bypasses (70.6%, n = 12/17) to manage biliary and duodenal obstruction.

The remaining 4 patients (13.3% of the total cohort, all presenting with advanced stage III or IV disease) did not undergo surgery due to profound neoplastic cachexia, a critical performance status, or rapid clinical deterioration immediately following admission. These 4 patients received exclusive non-surgical palliative pathways consisting of best supportive care (analgesics according to the WHO three-step ladder, nutritional support, and hydration). Access to oncological medical therapies was low; only 5 patients in the overall cohort were able to receive adjuvant or palliative chemotherapy due to extreme financial constraints and lack of health insurance coverage.

3.5. Postoperative Outcomes and Survival

The mean length of hospital stay was 15 days.

Using the surgical denominator ($n = 26$), the early 30-day postoperative morbidity rate was 76.9% ($n = 20$). Early complications were dominated by hemorrhagic complications of the operative site or abdominal wall (46.2%, $n = 12/26$), followed by biliary fistulas (15.4%, $n = 4/26$) and pancreatic fistulas (7.7%, $n = 2/26$).

During the immediate 30-day postoperative observation period, perioperative mortality was 11.5% ($n = 3/26$), secondary to severe postoperative hypovolemic shock or biliary sepsis.

Over the entire follow-up period, 11 deaths occurred in total across the whole cohort ($n = 11/30$), resulting in an overall cohort mortality rate of 36.7%. The remaining 8 deaths occurred later during follow-up due to carcinomatous progression [9]. The median survival time for the entire cohort after initial diagnosis was 5.3 months.

4. Discussion

Despite its monocentric and retrospective nature, our study sheds crucial light on the reality of pancreatic cancer management in a resource-limited Sub-Saharan African setting. The hospital prevalence found (2.77%) is consistent with data reported in neighboring West African series, notably in Burkina Faso (1.6% to 1.7%) [10] [11] and Benin. This rate, comparatively lower than those observed in Europe or North America, is undoubtedly explained by underdiagnosis related to structural difficulties in accessing cross-sectional imaging. Nevertheless, according to the Global Burden of Disease Study 2021, while West Africa records some of the lowest incidence rates worldwide, it simultaneously displays one of the fastest annual increases (AAPC of 2.32%) [8].

The mean age of our patients (64.6 years) validates the classic epidemiological profile of an elderly disease, consistent with African [5] [10] [12] and international literature [3]. In contrast, our inverted sex ratio (0.87), indicating a slight female predominance, contrasts with global trends that classically describe a male predominance. This local phenomenon warrants exploration in larger cohorts to rule out recruitment bias.

The delay to specialized consultation, averaging 63 days, constitutes the Gordian knot of the prognostic issue. This substantial delay is comparable to that observed in other countries in the sub-region. It results from a cluster of intertwined factors: low public awareness regarding early symptoms, frequent and prolonged reliance on traditional medicine or self-medication, and the financial burden of the healthcare pathway. Consequently, this diagnostic delay directly translates into high rates of upfront advanced stages (with 56.7% of stage IV metastatic cases and 13.3% of stage III locally advanced tumors) [6] and marginal surgical resectability. This dramatic correlation is shared by several African authors where advanced stages regularly exceed 70%.

On a technical level, the unavailability of endoscopic ultrasound (EUS) at the Bouaké University Hospital represents a major loss of opportunity for patients.

EUS is now firmly established as the standard for characterizing small lesions, precisely evaluating local vascular invasion, and obtaining histological evidence via fine-needle aspiration biopsy [13] [14]. In the absence of this tool, CT scanning allows for presumptive orientation, but the fine assessment of resectability remains challenging. To minimize potential diagnostic misclassification, we maintained strict criteria for our presumptive group (22.7%), requiring a complete alignment of biochemical, clinical, and high-resolution tomographic findings.

The therapeutic arsenal deployed within our department reflects local medico-economic constraints. The clear predominance of palliative surgery (65.4% of operated cases) highlights that the surgeon's role in Sub-Saharan Africa is too often confined to symptomatic management of cholestatic jaundice or duodenal obstruction to ensure a dignified end of life [15]. Patients who presented with severe performance status impairment (13.3%) could not benefit from any aggressive surgical approach and were oriented toward exclusive non-surgical best supportive care.

Our high early 30-day postoperative morbidity rate (76.9%), particularly heavy regarding hemorrhage (46.2%), is explained by the nutritional frailty of patients seen at a stage of neoplastic cachexia, combined with coagulation disorders induced by prolonged cholestasis. This severe environment also accounts for our 11.5% early perioperative mortality rate.

Finally, the median survival of 5.3 months observed in our series seals the pejorative prognosis of PC. This dramatic figure aligns with Western statistics for metastatic stages. The lack of access to modern first-line systemic chemotherapy regimens (such as FOLFIRINOX or Gemcitabine-Nab-Paclitaxel), validated by contemporary international guidelines such as the NCCN (v2.2025) [7] or ESMO [16], is explained by their prohibitive cost and the complexity of their management in the absence of an efficient universal health coverage system.

5. Conclusion

Pancreatic cancer at the Bouaké University Hospital is a formidable pathology, too often diagnosed at an incurable stage in elderly and frail patients. The prognosis remains catastrophic due to major consultation delays, a deficient diagnostic technical infrastructure (lack of endoscopic ultrasound), and financial barriers to accessing modern oncological therapies.

Author Contributions

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Supervision and revision of the work: all authors.

All authors have read and approved the published version of the manuscript

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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