

## ORIGINAL RESEARCH

# Placement of percutaneous transhepatic metallic biliary stents for malignant causes of obstructive jaundice: A retrospective study investigating the early experiences at a private hospital in Lagos, Nigeria

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## Abstract

### Background

The capacity and expertise for self-expanding percutaneous transhepatic metallic biliary stent (PTMBS) placement for palliative care in patients with malignant obstructive biliary diseases have recently been established at a private centre in Lagos, Nigeria. This article highlights the clinical and procedural aspects of the initial 18-month experience.

### Methods

Between November 2018 and June 2020, PTMBS placement was performed on 16 patients. Data on patient demographics, chief complaints, primary diagnoses and diagnostic methods, concurrent procedures during stent placement, stent numbers, procedural complications, and postprocedural survival were collected and analysed.

### Results

The cohort comprised 9 males and 7 females, with a mean age of 61 years. Presenting symptoms included eye and skin jaundice and pruritus, with Eastern Cooperative Oncology Group Performance Status scores of 0 for 2 patients, 1 for 9 patients, and 2 for 5 patients. Diagnoses included cholangiocarcinoma in 7 patients (44%) and pancreatic cancer in 5 (31%). All procedures were successful on the first attempt. Complications included 1 case each of intraoperative ileus, operative site infection, suspected cholangitis with sepsis, and death due to severe sepsis. Reintervention of the placed stent was necessary in 3 instances. Additional intraoperative procedures, such as brush biopsy and ultrasound-guided needle biopsy, were conducted for 7 patients. At the time of reporting, 5 patients (31%) remained alive at 22, 11, 8, 5, and 1 month(s) following the procedure.

### Conclusions

This report validates the feasibility of advanced interventional radiology procedures like PTMBS placement in our region despite the inherent challenges.

**Keywords:** malignant obstructive jaundice, percutaneous transhepatic metallic biliary stenting, cholangiocarcinoma, pancreatic cancer, Nigeria

## Introduction

The term obstructive jaundice refers to the yellowness of the sclera and mucosa membranes caused by hyperbilirubinaemia, secondary to intrinsic or extrinsic obstruction of the biliary system.<sup>[1]</sup> In the West African region, malignant conditions are the most common causes of obstructive jaundice.<sup>[2]-[5]</sup> Typically, patients present with advanced

disease, rendering curative surgery infeasible. Moreover, the lack of advanced palliative options, such as endoprotheses and brachytherapy, leads to a severe decline in disease-related quality of life and a dismal prognosis.

The placement of percutaneous transhepatic metallic biliary stents (PTMBS) for palliative management of inoperable or unresectable malignant causes of obstructive jaun-

dice is central to contemporary care. Endoscopic stenting is also a standard care practice, and surgical biliodigestive bypass remains an option for some. The effectiveness of PTMBS has been confirmed by research from Africa and other regions,<sup>[6]-[9]</sup> and its value is particularly evident in obstructive jaundice resulting from advanced pancreatic head cancer, a prevalent cause of malignant obstructive jaundice in this region.<sup>[2]-[5],[10]</sup> Previous publications have highlighted the shortfall in expertise, equipment, and support facilities for conducting this vital procedure in West Africa.<sup>[7]</sup>

The means for PTMBS placement have recently become available at a private centre in Lagos, Nigeria. This article outlines important elements of our preliminary 18-month experience, including patient characteristics, stenting indications, procedure-associated complications, additional intraoperative procedures, and the outcomes of these cases.

## Methods

### Study design and setting

This was a retrospective, cross-sectional survey conducted at a private centre in Lagos, Nigeria.

### Ethical approval

The institution's ethical review board granted ethical clearance for the study.

### Data collection

Data were collected for all patients who underwent PTMBS placement for palliative management of inoperable malignant causes of obstructive jaundice from November 2018 through June 2020, retrieved from clinic visits and procedure records in September 2020. Patient demographics, including age and sex, were documented along with principal clinical symptoms. The specific indication for PTMBS was symptom relief and palliation in the absence of curative therapy to halt disease progression. The primary diagnosis leading to obstructive jaundice and the diagnostic approach were ascertained. Aspects of the PTMBS placement procedure were identified, including any failed attempts, number of stents placed, ancillary intraoperative procedures performed (diagnostic or therapeutic), complications arising from stenting, and survival after stent placement. Given the inherent risks and complications associated with the procedure and the diminished life expectancy in patients with advanced, inoperable/unresectable cancers, relief of jaundice was not the sole indication for stenting in any case.

### Stenting procedure

Informed consent was obtained from each patient before the respective procedures. Patients were prepped and draped in a sterile manner, and moderate conscious sedation was achieved using intravenous fentanyl and midazolam, complemented by local anaesthesia with 2% lidocaine. Under real-time ultrasound guidance, a long 21G needle was advanced towards a peripheral bile duct, and contrast was hand-injected to opacify dilated bile ducts and locate the obstruction. The AccuStick Introducer System (Boston Sci-

entific, Marlborough, MA, USA) then facilitated stent insertion, with a 0.035-in wire advanced into the common bile duct and the AccuStick exchanged for a 6F sheath. The biliary tract obstruction was navigated using an angled catheter and Glidewire (Terumo, Tokyo, Japan), which were passed into the duodenum beyond the sphincter of Oddi. Brush biopsies of the bile duct were performed using a cytology brush (Boston Scientific) if indicated, along with sweeping of the common bile duct with a Fogarty balloon.

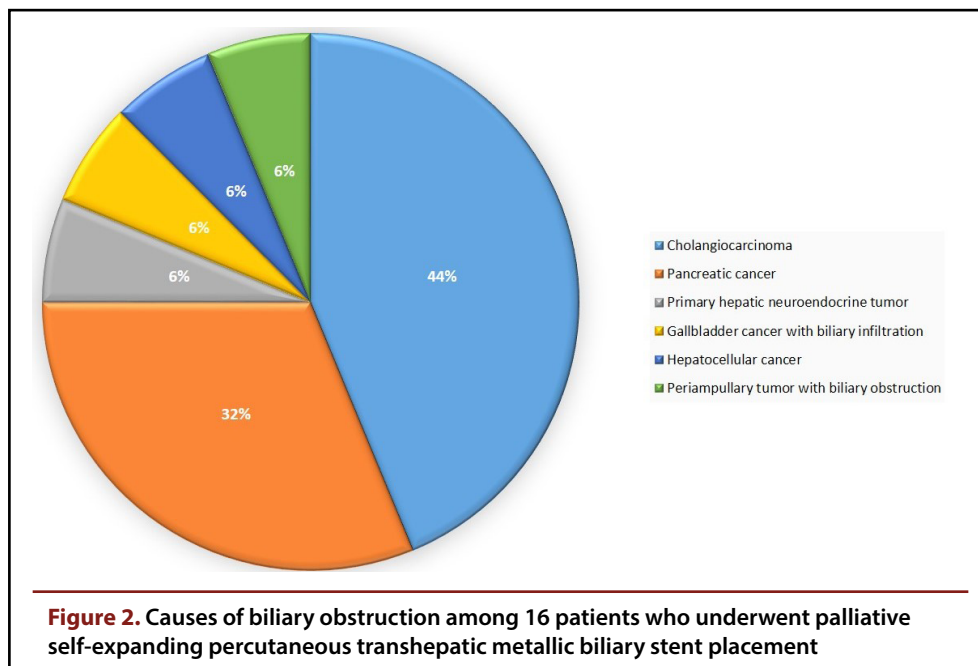
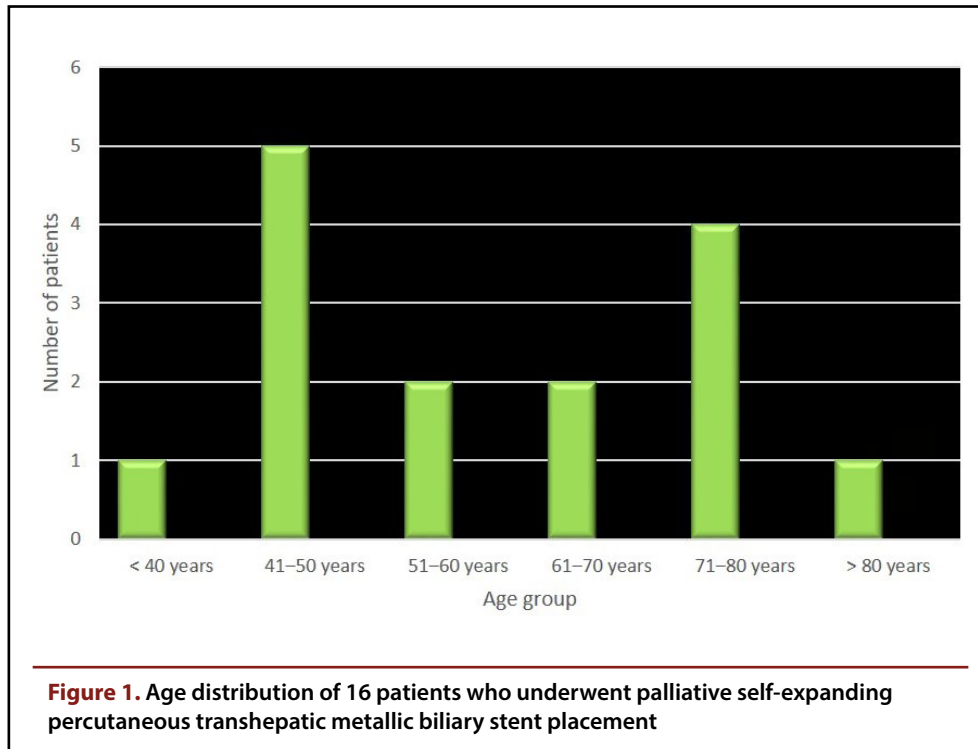
A 12 × 80 mm biliary stent (LifeStent, Bard Peripheral Vascular, Tempe, AZ, USA) was deployed within the common bile duct and extended through the sphincter. This was followed by dilation with a 9-mm balloon at the obstruction site in the midportion of the common bile duct and at the sphincter of Oddi. Stent positioning was confirmed via cholangiography. The hepatic tract was sealed with Gelfoam (Pfizer, New York, NY, USA), and the entire system was then removed.

## Results

A total of 16 patients underwent self-expanding PTMBS placement. The cohort consisted of 9 men and 7 women, with a mean age of 61 years (range, 39-86 years) (Figure 1). All participants presented with scleral icterus, while 10 (63%) experienced generalized pruritus, often debilitating. Additional clinical features included anorexia, malaise, and increasing listlessness. At presentation, the Eastern Cooperative Oncology Group Performance Status was 0 for 2 patients, 1 for 9 patients, and 2 for 5 patients. The indications for PTMBS placement were diverse, with 7 (44%) cases of cholangiocarcinoma, 5 (31%) of pancreatic cancer, and 1 (6%) each of gallbladder cancer with biliary infiltration and periampullary tumour causing biliary obstruction. There were 2 instances of extrinsic bile ductular compression due to primary hepatic malignancies—1 from hepatocellular carcinoma and the other from a rare primary hepatic neuroendocrine tumour (Figure 2). The stenting procedure was suc-

**Table. Outcomes of 16 patients who underwent palliative self-expanding percutaneous transhepatic metallic biliary stent placement**

Outcome	n (%)
<b>Complications</b>	
Sepsis	2 (12)
Surgical site infection	1 (6)
Intraoperative ileus	1 (6)
<b>Repeat stenting (causes)</b>	
Stent occlusion	2 (12)
Stent fracture	1 (6)
<b>Survival</b>	
Died	11 (69)
Survived	5 (31)



successful on the first attempt in all 16 patients. Complications included 1 case each of intraoperative ileus, operative site infection, sepsis with suspected cholangitis, and death from overwhelming sepsis within 10 days of the procedure. Stent revision was required in 3 instances due to occlusion at 3 and 4 weeks, respectively, and 1 stent fracture after 2 months (Table). Additional intraoperative procedures were performed on 4 patients (25%), with brush biopsies for cytological diagnosis and ultrasound-guided needle core biopsies of lesions conducted in 2 cases each (12.5%). Although formal quality-of-life assessments were not conducted, it was observed that pruritus and anorexia were the symptoms most rapidly alleviated, halting rapid weight loss noted be-

fore stent placement. As of September 2020, 5 patients (31%) were still alive at 22, 11, 8, 5, and 1 month(s) after their respective procedures. Among the deceased, the mean survival was 4 months after stent placement, with the shortest duration being 10 days and the longest 11 months. One death was directly attributable to overwhelming sepsis; however, the other causes of death were not confirmed, though progression of the primary malignant disease was presumed.

## Discussion

PTMBS placement is currently a mainstay of the standard palliative management of inoperable or unresectable malig-

nant causes of obstructive jaundice.[6] The benefits of such high-end interventional procedures have been corroborated by published findings from within our continent.[7],[8] Other management options include endoscopic stenting, surgical biliodigestive bypass, and brachytherapy. Malignancies account for 60%-90% of causes of obstructive jaundice in Nigeria and the surrounding region, with many patients presenting late when therapeutic surgery is no longer feasible.[3],[5] The scarcity of palliative interventions means that most of these patients are presented to centres where their symptoms cannot be significantly alleviated. The availability of interventional radiology expertise and capacity in our setting has been a significant advancement, which this paper documents over our initial 18 months of experience with PTMBS placement.

The mean age of the 16 patients who underwent PTMBS placement at our centre was 61 years, which is consistent with the age range for common malignant causes of obstructive jaundice in our country[2],[3],[5] and other parts of the world.[7]-[9] Although the proportion of pancreatic cancer patients was notable in our series (31%), cholangiocarcinoma was the predominant malignancy (44%). Contrary to other national reports that identify pancreatic cancer as the most prevalent malignant cause of obstructive jaundice, a study from Ghana by Sarkodie et al.[7] found that cholangiocarcinoma was the most common cancer among patients requiring stent placement.[2],[3],[5]

All our patients exhibited clinical jaundice, but this was not the sole criterion for PTMBS intervention unless it was accompanied by other distressing symptoms. While stenting is known to improve the quality of life for patients with malignant obstructive jaundice, its effectiveness for jaundice relief alone is less evident.[11],[12] The additional distressing symptoms in our patients included refractory pruritus and other debilitating general symptoms, such as extreme malaise and anorexia, all typical of this condition.[1] Clinically, we observed that PTMBS significantly alleviated pruritus and anorexia, providing the most relief to our patients, a finding supported by Ballinger et al.[13]

The substantial benefit of stenting in our patients, who typically present late, is noteworthy, suggesting that such minimally invasive procedures are of significant benefit to our local population when available and accessible.[10] However, PTMBS does come with its challenges. The incidences of surgical site infection, sepsis, cholangitis, and sepsis-related death (6% each) in this study are in line with rates from larger, established centres.[14] Our overall complication rate was 24%, mostly attributable to infections, which is slightly above the 18% complication rate related to stent insertion reported by Lawson et al.[8] In a study reported by Kaw et al.,[9] stents were placed endoscopically, with no reported postoperative complications. Our restenting rate was 19%, similar to the 18% in the study by Laméris et al.[15] but higher than the 12% reported by Brountzos et al.[16] These discrepancies in complication and restenting rates may reflect differences in experience and expertise. Hence, we propose that while the potential for complications exists, it should not deter the establishment of centres for percutane-

ous biliary stenting in our region. Instead, it should encourage practitioners to focus on developing both expertise and infrastructure, along with judicious patient selection criteria. Our future practice will particularly aim to improve the prevention of surgical infections.

The mean survival time after PTMBS placement in our study was 4 months, comparable to the 4.7 months reported by Brountzos et al.[16] and the 3.5 months reported by Indar et al.[17], but longer than the 78 days reported by Kaw et al.,[9] who investigated patients undergoing endoscopic stenting.

PTMBS placement offers the additional benefit of allowing ancillary procedures to be carried out concurrently, as was done for 7 patients in this series. The significance of this report is enhanced by the limited availability of endoscopic palliative stent placement in our setting. However, this was not a deterrent to PTMBS placement, which was supported by numerous noncomparative studies that have shown no superiority of either technique over the other in terms of technical success, complications, and mortality for distal bile duct obstruction.[18]

## Limitations

A limitation of our study was the small sample size, which partly resulted from the novelty of PTMBS in our environment and its considerable financial implications for most patients. We are optimistic that uptake and affordability will improve over time. Furthermore, we did not formally assess postoperative quality of life, which we acknowledge as an area for future research.

## Conclusions

PTMBS placement presents significant challenges in resource-limited contexts. Despite these challenges, our findings demonstrate that successful implementation is achievable. Our audit of the first 18 months of operations revealed that PTMBS placement can have a positive impact on the quality of life and survival of patients with inoperable malignant causes of obstructive jaundice. Additionally, our findings highlight the necessity for a broader availability of centres capable of performing this critical procedure in Nigeria. We also aim to inspire further research on PTMBS placement in resource-limited settings like ours, focusing on objectively assessing quality of life and evaluating the healthcare costs and cost-effectiveness of this vital procedure.

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