



A-JMRHS

## INCIDENCE CLINICOPATHOLOGICAL AND RADIOLOGICAL CHARACTERISTICS AFFECTING PARA AORTIC LYMPHNODE METASTASIS IN PANCREATICO BILIARY MALIGNANCY – A PROSPECTIVE STUDY

Subrat Kumar Samantara<sup>1</sup>, Swodeep Mohanty<sup>2</sup>, Bharat Bhusan Satpathy<sup>3\*</sup>, Chandra Majhi<sup>4</sup>, Jyoti Ranjan Swain<sup>5</sup>, G Harihara Sudan<sup>6</sup>, Shakti Prakash Mishra<sup>7</sup>

<sup>1,2</sup>Professor, Department of Surgical Oncology, AHPGIC, Cuttack.

<sup>3\*</sup>Associate Professor, Department of Surgical Oncology, AHPGIC, Cuttack.

<sup>4,5</sup>Assistant Professor, Department of Surgical Oncology, AHPGIC, Cuttack.

<sup>6</sup>MCh PG resident, Department of Surgical Oncology, AHPGIC, Cuttack

<sup>7</sup>Professor Plastic Surgery, Burns & Trauma Surgery, PGIMER & Capital Hospital, Bhubaneswar.

**Corresponding Author:** Dr. Bharat Bhusan Satpathy

Associate Professor, Department of Surgical Oncology, AHPGIC, Cuttack.

**Email:** dr.bharatsatpathy@gmail.com

### INTRODUCTION

The most common type of biliary system cancer is gallbladder cancer. The fifth most common type of gastrointestinal tract cancer. In 2022, 1.2% of Indians had GBC (Globocan). Gallbladder cancer was more common in women and Caucasians than in African Americans and men. (three to four times)<sup>[1]</sup>.

According to recent research, GBC rates in Northern India, particularly in the states of West Bengal, Uttar Pradesh, and Bihar, increased from 15.2 per 100,000 in 2018 to 18.0 per 100,000 in 2023. Numerous studies have connected environmental exposures—such as contaminated water and elevated heavy metal levels—to the elevated risk in the Gangetic belt, which is already acknowledged as a high-risk area. (2) Dietary practices and genetic traits also have an impact. Two states with moderate incidence rates are Odisha and Assam. Population-based figures show that GBC is somewhat common in northeastern Indian cities (5-7 per 100,000 individuals).

Pancreatic ductal adenocarcinoma is the fourth most common cause of cancer-related mortality worldwide. According to GLOBOCAN 2022 (3), this cancer represents 3.1% of all cancers and has an Age Standardised Rate (ASR) of 4.9 per 1,000,000 males and 3.6 per 1,000,000 women. The incidence of PDAC is relatively low in most parts of India, ranging from 0.5 to 2.4 per 100,000 men and 0.2 to 1.8 per 100,000 women.



www.ajmrhs.com  
eISSN: 2583-7761

Date of Received: 25-05-2026

Date Acceptance: 02-06-2026

Date of Publication: 01-07-2026

In northern and western India, the prevalence is greater among urban males. PDAC is responsible for 0.5–2% of all gastrointestinal cancers and 20% of all extrahepatic biliary tree tumours. An analysis of 2564 resected PDACs over a thirty-year period revealed that 66% of the carcinomas were pancreatic, 16% were ampullary, 12% were biliary, and 6% were duodenal.

The lymph node status is a critical prognostic factor for patients with resected biliary cancer, including gallbladder carcinoma, ampullary carcinoma, intrahepatic cholangiocarcinoma, hilar cholangiocarcinoma, and distal cholangiocarcinoma [4] According to earlier studies on the lymphatic distribution of biliary carcinoma, the disease initially spreads to lymph nodes in the hepatoduodenal ligament, which is situated close to the common hepatic artery. Many researchers have proposed paraaortic lymph node dissection as a treatment for biliary cancer. Every patient had regional and para-aortic lymph node dissection. From the upper coeliac trunk to the upper part of the inferior mesenteric artery origin, the para-aortic lymph nodes were dissected [4].

In 2014, the International Study Group for Pancreatic Surgery (ISGPS) published a consensus document recommending a regular lymphadenectomy for pancreatic head malignancy. According to the Japanese Pancreas Society's nomenclature, these lymph nodes are situated along the hepatic ligament (stations 8a, 12b, and 12c), in the pyloric gland (stations 5 and 6), on the right side of the superior mesenteric artery (stations 14a and 14b), and on the front and rear of the pancreatic head (stations 17 and 13).

It was contentious to remove interaortocaval lymph nodes, which are lymph nodes located posterior to the pancreas between the aorta and the inferior vena cava [5] The Union for International Cancer Control (UICC) and the Japanese Pancreas Society both view PALN metastases as remote rather than

locoregional<sup>[6]</sup>

Due to prior data demonstrating lower survival rates in PDAC patients with PALN metastases, many surgeons consider avoiding operating on these patients. In other trials, including those with lymph node metastases (N+), the presence or absence of PALN metastases did not appear to have an impact on survival rates<sup>[5]</sup>.

Surgical literature and practice discuss three different approaches: not performing paraaortic lymphadenectomy, sampling PALN and stopping the resection if the results are positive on frozen section, or performing paraaortic lymphadenectomy in the standard pancreatic head resection, regardless of PALN metastases. We performed PALN dissection and a prospective analysis to ascertain the frequency and prognostic significance of PALN involvement in patients following biliary and pancreatic cancer resection.

## MATERIAL & METHODS

### Study Setting:

This research involved patients undergoing definitive surgery for pancreaticobiliary cancer from the Surgical Oncology department at AHPGIC, Cuttack.

### Study Design:

In this prospective observational analysis, patients with pancreaticobiliary cancer who were undergoing definitive surgery were studied.

### Study Duration:

The study was conducted from January 1<sup>st</sup> 2023 to March 31<sup>st</sup> 2025

### Institutional Review Board and Ethics Committee Approval

The study methodology and design were both reviewed and approved by the appropriate ethical committee and institutional review board. Copy of the authorisation form enclosed.

### Inclusion Criteria:

1. Pancreaticobiliary cancer patients including periampullary cancer, cancer of the gallbladder, distal cholangiocarcinoma, duodenal carcinoma, carcinoma pancreatic head undergoing definitive surgery

upfront and after NACT.

2. Age more than 18years

### Exclusion Criteria:

1. Patients not medically fit for surgery
2. Patients with metastatic disease and intraoperative finding of inoperability
3. Not willing to give consent for the study

### Methology

Participants meeting inclusion criteria and patients presenting to the surgical oncology department with biliopancreatic cancer (carcinoma gallbladder, head of pancreas, distal CBD, duodenal/ampullary) were included in project. In outpatient section patient evaluations done. Comprehensive history taking, physical examination, standard blood tests, tumour markers (CA 19-9, CEA), and upper GI endoscopy (with or without biopsy) make up the initial workup. A chest radiograph and CECT scan ( triple phase pancreatic protocol), will determine operability. Patients with metastases received palliative care. The patient's postoperative development was closely observed and recorded. Following surgery, antibiotics are administered in accordance with institutional procedure. Deep vein thrombosis prevention with a DVT pump started during surgery and lasted until the patient could walk. Pharmacologic thromboprophylaxis was administered to each patient individually. Up to the day of discharge, we kept track of any difficulties that arose during the postoperative phase.

## RESULTS

The descriptive analysis was carried out based on the categories of parameters. The most recent version of SPSS was utilised for statistical analysis. Continuous data was represented by proportions. Discrete variables were analysed using the chi-square or Fisher-extraction tests. We evaluated the independent variables of mortality and morbidity using either univariate or multivariate logistic regression. Significance was defined as a p-value of less than 0.05. Of the 55 GBC patients who had radical surgery, 29 patients (52.7%) had an upfront diagnosis, 18 cases (32.7%) had incidental GBCs during cholecystectomy, 6 cases (10.9%) had GBCs following NACT, and 2 cases (3.7%) had both iGBC and post NACT.

**Table 1:** Gbc Cohort

Diagnosis	Number	Percentage
Gb Mass (Upfront)	29	52.7%
Ca Gb Post Cholecystectomy	18	32.7%
Ca Gb Post Nact	6	10.9%
Ca Gb Post Cholecystectomy & Nact	2	3.7%

**Demographic Profile-** The prospective trial comprised 55 patients with resectable GBC. After obtaining informed permission from each patient and describing the researchs goals in their native language, we enrolled them all in the trial.

**Age-** The participant’s ages ranged from 30 to 77, with 58 being the median. The

percentage of patients under the age of 50 was 36.4%. Radical cholecystectomy with PALN dissection was performed on all patients. The youngest patient enrolled was 30-year-old man who presented with a GB mass.

**Sex-** out of 55 patients enrolled in the study, 16 (29.1%) were male, and 39 (70.9%) were female.

**Table 2a: Demographic Profile in Gbc**

Variables		Number	Median/ Percentage
Age		55	58 Years
Sex	Male	16	29.1%
	Female	39	70.9%

**Table 2b: Age Distribution in Gbc**

Age	30-40yrs	40-50yrs	50-60yrs	60-70yrs	70-80yrs
Number	7	13	14	17	4
Percentage	12.7%	23.7%	25.4%	30.9%	7.3%

**Table 3: Clinical Features in Gbc**

Clinical Presentation	Number	Percentage
Abdominal Pain	24	43.6%
Palpable Gb	10	18.2%
Non Specific Symptoms	21	38.2%

**Tumor Markers**

Median CA 19-9 was 30.6 with range from 2.0 – 589.22. Median CEA was 2.66 with range from 0.68 – 12.84. CA 19-9 level

>20U has a sensitivity & specificity >79%.CEA >4ng has a specificity of 93% & sensitivity of 50%.

**Table 4: Tumor Markers in Gbc**

Marker	Median	Range
Ca 19 – 9	30.6	2.0 – 589.22
Cea	2.66	0.68 – 12.84

**Table 5a: Pathological T Staging**

Pt STAGING	NUMBER	PERCENTAGE
Pt0	16	29.1%
Pt1	14	25.4%
Pt2	21	38.2%
Pt3	4	7.3%

**Table 5b: Pathological N Staging**

Pn Staging	Number	Percentage
Pn0	30	54.5%
Pn1	20	36.4%
Pn2	5	9.1%

**Table 5c: Other Post Op Hpe Findings in Gbc**

Post Op Hpe	Number	Percentage
Ln Level 8,12,13 Involvement	25	45.5%
Paln Involvement	10	18.2%
Lymphovascular Invasion (Lvsi)	15	27.3%

Perineural Invasion (Pni)	9	16.4%
Margin Postove (Cystic Duct)	1	1.8%

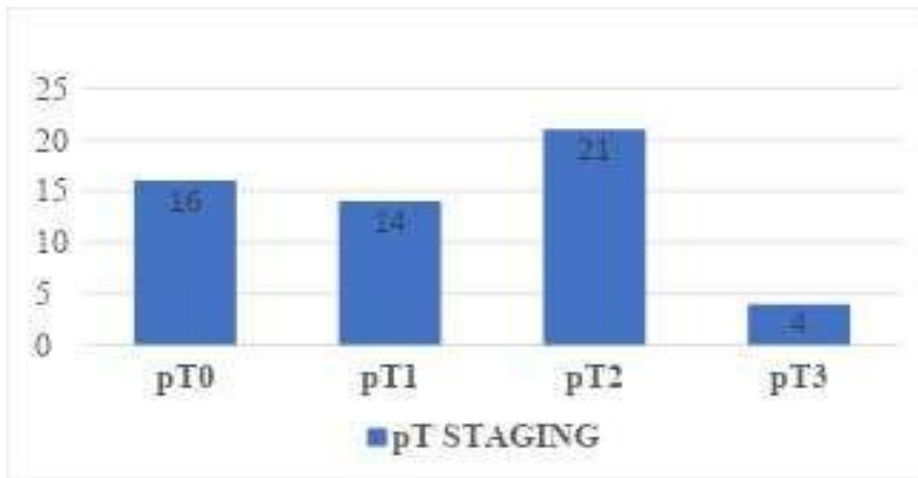


Figure 1a: Pathological T Staging in Gbc

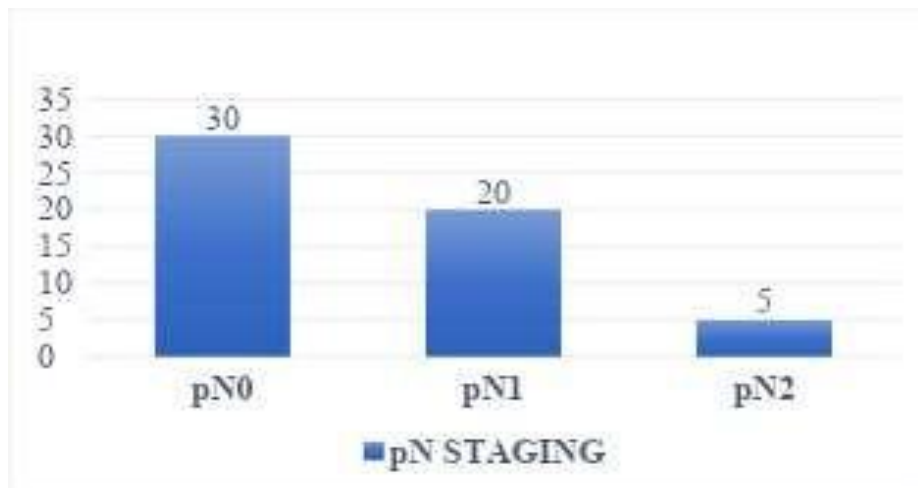


Figure 2b: Pathological N Staging in Gbc

Figure 1A: Post Radical Cholecystectomy Pain Site

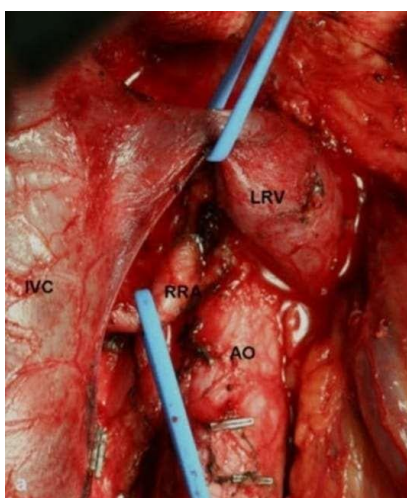
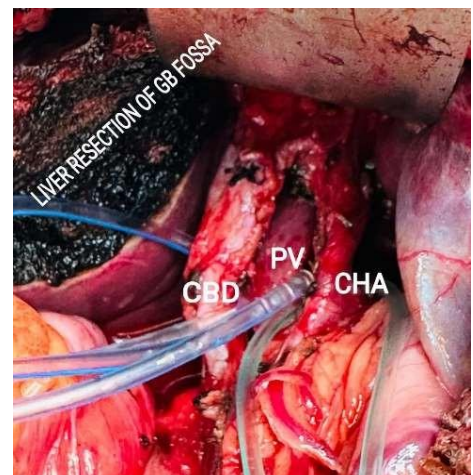
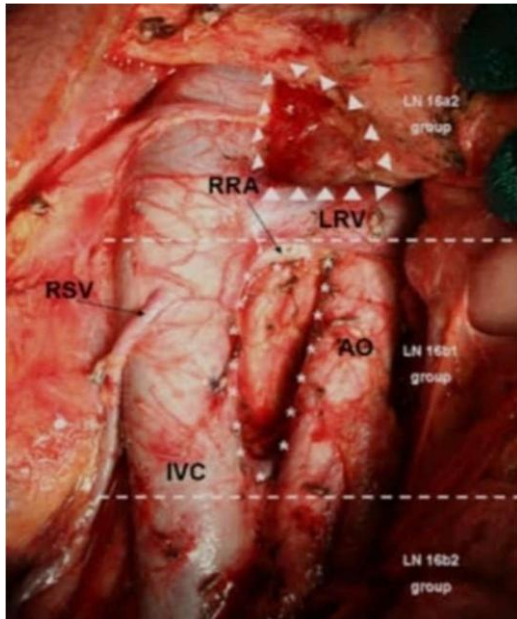


Figure 1b: Post Rc Resection Bed



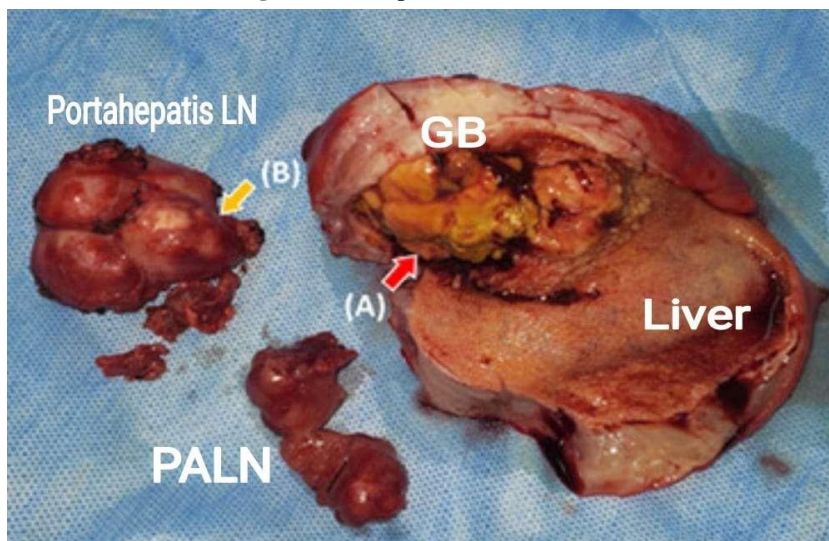
**Figure 2a:** Post Pancreatico Duodenectomy Paln Site



**Figure 2b:** Figure 1b: Post Pd Resection Bed



**Figure 3:** Rc Specimen With Paln



**Figure 4:** Pd Specimen with Paln



**DISCUSSION**

GB lymphatic drainage takes three different paths: The cholecysto-retropancreatic pathway is the main

route for the gallbladder's lymphatic drainage, with the cholecysto-celiac and cholecysto-mesentric paths acting as backup routes. (15) Numerous studies on

lymphatic drainage channels indicate that PALN plays an important function in the pancreatic head lymphatic drainage. (45) Regardless of the tumour histological origin, peri-ampullary malignancies undergo lymphatic drainage from either the anterior (station 17) or posterior (station 13) surface of the pancreatic head, via the SMA (station 14), and to the para-aortic station (station 16). (46) According to certain anatomical studies,

Rarely, lymphatic drainage connects directly with the nodal stations along the correct hepatic artery (station 8), avoiding the coeliac axis lymph nodes (station 7). After that, this drainage travels to station 16. Some studies found no difference in the survival rates of patients undergoing resection with or without positive PALN. A study of positive LNs at stations 8a and 16b1 found no association between positive 16b1Lns and survival, although data on lymphatic drainage channels suggests that Ln16b1 plays a major role in the main lymphatic drainage channel. However, no consensus was reached on Ln16b1 because of disparities in the literature and divergent expert opinions at the consensus meeting. Some surgeons remove this node since it is included on the resection plane. In reality, we did not observe any significant adverse events in our series that were directly related to the removal of station 16. Dissecting the para-aortic nodes is not a difficult procedure (it may be done simply straight after the Kocher's technique) and it does not result in further difficulties. Only station 16b1 was to be removed, according to the participants at their consensus meeting in Verona. The presence of PALN metastases was evaluated in each patient.

The two halves of the cohort consisted of patients with para-aortic nodal metastases (PALN+) and those without para-aortic nodal involvement (PALN-group). Our results show that the PALN is involved in 18.2% of gall bladder carcinoma cases (10 cases) and 17.8% of pancreatic carcinoma cases (8 cases), which include two head of pancreas and six periampullary tumours. Yoshida et al. performed a retrospective analysis on 101 patients who received PD in order to treat peri-ampullary carcinoma.

In their research. PALN was present in 15% of patients with pancreatic and distal CBD tumours, respectively. Of the 48 PDACs examined by Schwarz et al., 15.3% tested positive for PALN; Murakami et al., 15% tested positive for biliary carcinoma 16a2+16b1; Yamada et al., 13.4% tested positive for PDAC; Shimada et al., 19.8% tested positive for PDAC; and Kayahara et al., 18.2%. Studies show that station 16 is involved in 10–25% of cases of biliopancreatic cancer. The incidence of PALN is equal to the rate of hepatoduodenal ligament lymph node metastases.

Furthermore, following surgery, one patient with para-aortic node positive biliary carcinoma lived for

more than ten years without experiencing a recurrence. A case of GBC with PALN metastases that had survived was reported by Shinkai et al. more than seven years after the radical surgery. Since they were not looked at in our current investigation, postoperative complications and survival rates will be evaluated in future research.

These results lead us to the conclusion that para-aortic nodal metastases found during surgery should be treated as any other type of regional lymph node metastasis and should no longer be a reason to forego extensive treatment. The results of this study suggest that IACLN should not be regarded as a metastatic disease and are probably a separate entity that requires more research. The existence of an IACLN should not be viewed as a total impediment to resection in this era of multimodality therapy.

### CONCLUSION

The incidence of PALN+ was 18% in patients with biliopancreatic cancer who underwent definitive surgery (18.2% in GBC and 17.8% in pancreatic carcinoma). When a preoperative radiological diagnosis of PALN >1 cm was made, NACT treatment was started. PALN involvement was indicated by a greater radiological tumour size (>3 cm), a higher CA 19-9 level, and a higher rate of LVI/PNI positivity in HPE. In the near future, more follow-up will be conducted to examine oncological outcomes and surgical complications in PALN+ patients.

### REFERENCE

1. Okumura K, Gogna S, Gachabayov M, Felsenreich DM, McGuirk M, Rojas A, et al. Gallbladder cancer: Historical treatment and new management options. *World J Gastrointest Oncol.* 2021 Oct 15;13(10):1317–35.
2. Bhagat TS, Gulati G, Bhagat R, Gupta S. Epidemiology of gallbladder cancer in India 2018–2023. *Santosh Univ J Health Sci.* 2024 Jan;10(1):87–92.
3. Sikdar N, Saha G, Dutta A, Ghosh S, Shrikhande SV, Banerjee S. Genetic Alterations of Periampullary and Pancreatic Ductal Adenocarcinoma: An Overview. *Curr Genomics.* 2018 July 2;19(6):444–63.
4. Murakami Y, Uemura K, Sudo T, Hashimoto Y, Nakashima A, Kondo N, et al. Is Para-aortic Lymph Node Metastasis a Contraindication for Radical Resection in Biliary Carcinoma? *World J Surg.* 2011 May;35(5):1085–93.
5. Petrova E, Mazzella E, Trojan J, Koch C, Schulze F, Bechstein WO, et al. Prognostic value of paraaortic lymph node metastases in patients with ductal adenocarcinoma of the

- pancreatic head. *Eur J Surg Oncol*. 2023 May;49(5):996–1000.
6. Nakao A. Oncological problems in pancreatic cancer surgery. *World J Gastroenterol*. 2006;12(28):4466.
  7. Barreto SG, Pawar S, Shah S, Talole S, Goel M, Shrikhande SV. Patterns of Failure and Determinants of Outcomes Following Radical Re-resection for Incidental Gallbladder Cancer. *World J Surg*. 2014 Feb;38(2):484–9.
  8. Patkar S, Patel S, Gupta A, Ramaswamy A, Ostwal V, Goel M. Revision Surgery for Incidental Gallbladder Cancer—Challenging the Dogma: Ideal Timing and Real-World Applicability. *Ann Surg Oncol*. 2021 Oct;28(11):6758–66.
  9. Sirohi B, Mitra A, Jagannath P, Singh A, Ramadvar M, Kulkarni S, et al. Neoadjuvant Chemotherapy in Patients with Locally Advanced Gallbladder Cancer. *Future Oncol*. 2015 May;11(10):1501–9.
  10. Miller G, Jarnagin WR. Gallbladder carcinoma. *Eur J Surg Oncol EJSO*. 2008 Mar;34(3):306–12.
  11. Hawkins WG, DeMatteo RP, Jarnagin WR, Ben-Porat L, Blumgart LH, Fong Y. Jaundice Predicts Advanced Disease and Early Mortality in Patients With Gallbladder Cancer. *Ann Surg Oncol*. 2004 Mar;11(3):310–5.
  12. Pandey M, Sood BP, Shukla RC, Aryya NC, Singh S, Shukla VK. Carcinoma of the gallbladder: Role of sonography in diagnosis and staging. *J Clin Ultrasound*. 2000 June;28(5):227–32.
  13. Ohtani T, Shirai Y, Tsukada K, Muto T, Hatakeyama K. Spread of gallbladder carcinoma: CT evaluation with pathologic correlation. *Abdom Imaging*. 1996 May 1;21(3):195–201.
  14. Shukla PJ, Barreto SG, Arya S, Shrikhande SV, Hawaldar R, Purandare N, et al. Does PET–CT scan have a role prior to radical re-resection for incidental gallbladder cancer? *HPB*. 2008 Dec;10(6):439–45.
  15. Ito M, Mishima Y. Lymphatic drainage of the gallbladder. *J Hepatobiliary Pancreat Surg*. 1994 June;1(3):302–8.
  16. Aggarwal A, Goel S, Sayed AI, Goel V, Talwar V, Singh S. Interaortocaval Lymph Node Metastasis in Gall Bladder Cancer: Is It Regional Node or Metastatic Disease? *J Gastrointest Cancer*. 2023 Dec;54(4):1252–60.
  17. AJCC Cancer Staging Manual 8th Edition PDF.
  18. Agarwal AK, Kalayarsan R, Javed A, Gupta N, Nag HH. The Role of Staging Laparoscopy in Primary Gall Bladder Cancer—An Analysis of 409 Patients: A Prospective Study to Evaluate the Role of Staging Laparoscopy in the Management of Gallbladder Cancer. *Ann Surg*. 2013 Aug;258(2):318–23.
  19. Butte JM, Gönen M, Allen PJ, D’Angelica MI, Kingham TP, Fong Y, et al. The role of laparoscopic staging in patients with incidental gallbladder cancer. *HPB*. 2011 July;13(7):463–72.
  20. Patkar S, Patil V, Acharya MR, Kurunkar S, Goel M. Achieving margin negative resection—doing less is justified: oncological outcomes of wedge excision of liver in gallbladder cancer (GBC) surgery. *Chin Clin Oncol*. 2019 Aug;8(4):38–38.
  21. Nigri G, Berardi G, Mattana C, Mangogna L, Petrucciani N, Sagnotta A, et al. Routine extra-hepatic bile duct resection in gallbladder cancer patients without bile duct infiltration: A systematic review. *The Surgeon*. 2016 Dec;14(6):337–44.
  22. Kagedan DJ, Ahmed M, Devitt KS, Wei AC. Enhanced recovery after pancreatic surgery: a systematic review of the evidence. *HPB*. 2015 Jan;17(1):11–6.
  23. Sugita R, Furuta A, Ito K, Fujita N, Ichinohasama R, Takahashi S. Periapillary Tumors: High-Spatial-Resolution MR Imaging and Histopathologic Findings in Ampullary Region Specimens. *Radiology*. 2004 June;231(3):767–74.
  24. Siegel RL, Giaquinto AN, Jemal A. Cancer statistics, 2024. *CA Cancer J Clin*. 2024 Jan;74(1):12–49.
  25. Front Matter. In: Shackelford’s Surgery of the Alimentary Tract, 2 Volume Set [Internet]. Elsevier; 2019 [cited 2025 Aug 3]. p. i–iii. Available from: <https://linkinghub.elsevier.com/retrieve/pii/B9780323402323001886>

**How to cite this article:** Subrat Kumar Samantara, Swodeep Mohanty, Bharat Bhusan Satpathy, Chandra Majhi, Jyoti Ranjan Swain, G Harihara Sudan, Shakti Prakash Mishra, INCIDENCE CLINICOPATHOLOGICAL AND RADIOLOGICAL CHARACTERISTICS AFFECTING PARA AORTIC LYMPHNODE METASTASIS IN PANCREATICO BILIARY MALIGNANCY – A PROSPECTIVE STUDY, *Asian J. Med. Res. Health Sci.*, 2026; 4 (1):1564-1570.  
**Source of Support:** Nil, Conflicts of Interest: None declared.