

ENHANCING STOMACH CARCINOMA STAGING: A COMPREHENSIVE REVIEW OF THE ROLE OF STAGING LAPAROSCOPY AS AN ADJUNCT TO CECT ABDOMEN

ARVIND KANWAR¹, PARIKSHIT MALHOTRA², MANISH YADAV^{3*}, ABHINAV CHAUDHARY⁴, UK CHANDEL⁵

^{1,3}Department of Surgery, Dr YSPGMC Nahan, Himachal Pradesh, India. ²Department of Surgery, SLBSGMC Nerchowk, Himachal Pradesh, India. ⁴Department of Surgery, Dr RPGMC Tanda, Himachal Pradesh, India. ⁵Department of Surgery, IGMC Shimla, Himachal Pradesh, India
*Corresponding author: Manish Yadav; Email: dr.manish1075@gmail.com

Received: 20 Dec 2023, Revised and Accepted: 24 Jan 2024

ABSTRACT

Objective: Stomach carcinoma poses challenges in accurate staging and treatment planning. This study explores the evolving role of staging laparoscopy as an adjunct to contrast-enhanced computed tomography (CECT) in enhancing stomach carcinoma staging.

Methods: Conducted at Indira Gandhi Medical College and Hospital, Shimla, a one-year prospective study included biopsy-proven gastric carcinoma patients. Exclusion criteria involved neoadjuvant chemotherapy and proven metastasis. Investigations encompassed CECT, staging laparoscopy, and diagnostic lavage.

Results: TNM staging revealed a predominance of Stage IIA (21.9%) and IIIA (25%). Locally advanced cases demonstrated infiltration into other organs (53.1%). Occult metastasis was present in 28.2%, with 66.7% in ascites cases. Staging laparoscopy detected occult metastasis in 28.2%, complementing CECT limitations. Significant associations were noted between occult metastasis and CECT staging, particularly in Stage III (88.9%).

Conclusion: Integration of staging laparoscopy with CECT enhances precision in stomach carcinoma staging. Limitations of CECT in identifying occult metastasis are addressed by staging laparoscopy, providing valuable insights. Findings underscore the importance of CECT in advanced stages, contributing to comprehensive gastric cancer management. This study contributes to evolving diagnostic and therapeutic approaches, promising improved patient outcomes.

Keywords: Stomach carcinoma, Staging laparoscopy, Contrast-enhanced computed tomography, TNM staging, Occult metastasis

© 2024 The Authors. Published by Innovare Academic Sciences Pvt Ltd. This is an open access article under the CC BY license (<https://creativecommons.org/licenses/by/4.0/>) DOI: <https://dx.doi.org/10.22159/ijcpr.2024v16i2.4040> Journal homepage: <https://innovareacademics.in/journals/index.php/ijcpr>

INTRODUCTION

Stomach carcinoma, a formidable adversary in the realm of oncology, poses significant challenges in terms of accurate staging and subsequent treatment planning. As medical science progresses, the need for refining staging methodologies becomes paramount, and the integration of innovative techniques becomes imperative [1]. This article delves into the intricacies of stomach carcinoma staging, shedding light on the emerging role of staging laparoscopy as a crucial adjunct to contrast-enhanced computed tomography (CECT) of the abdomen. By exploring the synergies between these diagnostic modalities, we aim to unravel a more comprehensive and nuanced understanding of the disease, ultimately paving the way for improved patient outcomes [2].

Stomach cancer, or gastric cancer, ranks among the leading causes of cancer-related mortality worldwide. The challenges associated with its management are exacerbated by the complexity of disease progression and the diversity of clinical presentations. Accurate staging is pivotal for determining the most appropriate treatment strategy, ranging from surgery to chemotherapy and radiation therapy [3]. While CECT of the abdomen has long been a cornerstone in the staging process, its limitations in detecting subtle peritoneal metastases and small locoregional lesions have prompted the exploration of complementary modalities [4].

Staging laparoscopy, a minimally invasive surgical procedure, has emerged as a valuable tool in the diagnostic armamentarium for stomach carcinoma. Traditionally reserved for exploratory purposes, this technique has evolved into an adjunctive staging method, offering unparalleled insights into the peritoneal cavity and facilitating the identification of metastatic lesions that might escape the scrutiny of conventional imaging [5]. The synergy between CECT and staging laparoscopy holds the promise of a more accurate and holistic assessment of the disease, allowing for a more personalized and targeted approach to treatment [6].

This comprehensive review navigates through the existing landscape of stomach carcinoma staging, dissecting the strengths and limitations of both CECT and staging laparoscopy. By examining recent studies, technological advancements, and clinical outcomes, we aim to delineate the evolving role of staging laparoscopy in enhancing the precision of disease staging when employed in conjunction with CECT of the abdomen [7]. As we embark on this exploration, it is evident that the convergence of imaging and surgical modalities heralds a new era in the quest for optimal strategies in the management of stomach carcinoma [8].

MATERIALS AND METHODS

Study setup and design

- **Study Area:** The study was conducted in the Department of Surgery at Indira Gandhi Medical College and Hospital, Shimla.
- **Study Duration:** The study spanned a period of one year.
- **Study Description:** This was a prospective study.

Study population

- The study included patients with biopsy-proven gastric carcinoma in the Department of Surgery, IGMC, Shimla, who met the inclusion criteria.

Inclusion Criteria

1. Patients with endoscopic biopsy-proven carcinoma of the stomach deemed resectable on CECT thorax, abdomen, and pelvis.
2. Those who provided consent to participate in the study.

Exclusion Criteria

1. Patients who received neoadjuvant chemotherapy before staging laparoscopy.

- Patients with proven metastasis on CECT thorax, abdomen, and pelvis.
- Patients who did not provide consent.

Methodology

- All eligible patients underwent a series of investigations, including haemogram, renal function tests, liver function tests, CEA, CA 19-9, chest X-ray, CECT scan, staging laparoscopy, diagnostic lavage, and histopathological examination (HPE) of biopsy specimens obtained during staging laparoscopy.
- A written informed consent was obtained from all participants.
- Specific protocols were followed for CECT abdomen scan, staging laparoscopy, and diagnostic lavage.

CT protocol

- CECT was performed on a 64-slice MDCT (Light Speed VCT Xte: GE Healthcare).
- Patients underwent an overnight fast and received approximately 1.5-2 L of water as neutral oral gastrointestinal contrast, starting 2 h prior to the scan.
- Dual-phase CECT was conducted in late arterial and portal venous phases.
- Scan parameters included a slice thickness and interval of 5 mm and a helical scan type.
- Intravenous contrast dose was 1.5-2 ml/kg body weight administered at a rate of 3.5-4 ml/second by an automatic pressure injector.

Staging laparoscopy protocol

- Patients were placed in the supine position under general anesthesia.
- A 12 mm sub/supra umbilical incision was made, and pneumoperitoneum with CO₂ was established.
- Laparoscopy was performed using a 30 ° telescope, with additional 5-mm ports inserted as needed.
- The entire abdominal cavity was systematically inspected, and biopsies were taken from suspicious tissues.

- Peritoneal lavage was conducted in patients without occult metastases during diagnostic laparoscopy.
- Definitive surgery was performed on patients deemed resectable during laparoscopy.

Diagnostic lavage protocol

- The peritoneal cavity was washed with 200 ml of warm normal saline solution, instilled into different abdominal regions, and aspirated under direct vision.
- The aspirated fluid underwent centrifugation and staining using Giemsa and Papanicolaou methods.
- Experienced cytologists interpreted the results, classifying them as positive, negative, or suspicious based on cellular characteristics.

Ethical considerations

- Written informed consent was obtained from all participants.
- Confidentiality of collected information was strictly maintained, and individual identities were protected.
- Study results were intended solely for academic purposes and to frame recommendations for service improvement.

RESULTS

In our study, we evaluated the distribution of patients based on TNM staging using contrast-enhanced computed tomography (CECT). Table 1 illustrates the distribution across different stages, revealing a predominance of Stage IIA (21.9%) and Stage IIIA (25%). Locally advanced gastric cancer cases, as assessed by laparoscopy and CECT, demonstrated infiltration into other organs in 53.1% of cases. Notably, occult metastasis was identified in 28.2% of cases, with 66.7% of ascites cases also exhibiting occult metastasis.

Table 2 provides a detailed breakdown of locally advanced cases, highlighting the prevalence of serosal infiltration (9.4%) and infiltration into other organs (53.1%). Occult metastasis was absent in cases identified by CECT. Table 3 delves into the relationship between occult metastasis and CECT staging, revealing a significant association, particularly in Stage III (88.9%).

Our findings underscore the importance of CECT in identifying occult metastasis, especially in advanced stages, providing valuable insights for the comprehensive management of gastric cancer patients.

Table 1: Distribution of patients according to TNM staging on CECT

CECT Staging	Number of cases	Percentage
IA	0	0
IB	3	9.4%
IIA	7	21.9%
IIB	5	15.6%
IIIA	8	25%
IIIB	5	15.6%
IIIC	4	12.5%
Total	32	100%

Table 2: Distribution of patients with locally advanced cancer

Locally advanced gastric cancer	Staging laparoscopy	CECT
Infiltration of serosa	3 (9.4%)	8 (25%)
Infiltration into other organs	17 (53.1%)	8 (25%)
Occult metastasis	9 (28.2%)	Nil

Table 3: Occult metastasis in relation to cect staging

CECT Stage	Occult metastasis
I	0
II	1 (11.1%)
III	8 (88.9%)
TOTAL	9 (100%)

Ascites was present in total of 9 cases (28.2%). Out of these 9, in 6 cases (66.7%) occult metastasis was also present along with ascites

DISCUSSION

Stomach carcinoma presents a significant clinical challenge, demanding precise staging for optimal therapeutic strategies. Our comprehensive review explores the evolving landscape of stomach carcinoma staging, emphasizing the synergistic role of staging laparoscopy alongside contrast-enhanced computed tomography (CECT) of the abdomen [9]. The limitations of CECT in detecting subtle peritoneal metastases have prompted the integration of staging laparoscopy, a minimally invasive procedure that offers unique insights into the peritoneal cavity. By combining these modalities, our study reveals a nuanced understanding of the disease, with implications for treatment personalization [3].

Our findings highlight the prevalence of Stage IIA and IIIA gastric cancer, underscoring the importance of accurate staging for treatment planning. Locally advanced cases demonstrated infiltration into other organs, emphasizing the need for precise diagnostic tools [4]. The absence of occult metastasis in cases identified by CECT underscores its limitations, while staging laparoscopy detected occult metastasis in 28.2% of cases, substantiating its value in identifying metastatic lesions not captured by traditional imaging. The association between occult metastasis and CECT staging, particularly in Stage III, emphasizes the complementary nature of these diagnostic approaches. Notably, the presence of occult metastasis in ascites cases suggests a potential correlation with disease progression, warranting further investigation [5].

Our study, conducted at Indira Gandhi Medical College and Hospital, Shimla, integrates CECT, staging laparoscopy, and diagnostic lavage, providing a comprehensive evaluation of gastric cancer patients. The meticulous study design, ethical considerations, and detailed methodologies contribute to the reliability of our results [6]. Overall, our research advocates for the integration of staging laparoscopy as a valuable adjunct to CECT in enhancing the precision of stomach carcinoma staging [7]. The evolving role of these modalities heralds a new era in the pursuit of optimal management strategies for gastric cancer patients, with potential implications for improved patient outcomes. Our study adds to the existing body of knowledge, fostering a deeper understanding of the disease and paving the way for future advancements in diagnostic and therapeutic approaches [8].

CONCLUSION

In conclusion, our study advocates for the integrative use of staging laparoscopy with contrast-enhanced computed tomography (CECT) in stomach carcinoma staging. With a focus on patients at Indira Gandhi Medical College and Hospital, Shimla, our findings highlight the limitations of CECT in detecting occult metastasis and underscore the value of staging laparoscopy in providing crucial insights. This complementary approach enhances the precision of staging, offering potential improvements in treatment strategies and patient outcomes. The convergence of imaging and surgical

modalities signifies a promising avenue for refining the management of stomach carcinoma in the ongoing pursuit of optimal patient care.

FUNDING

Nil

AUTHORS CONTRIBUTIONS

All authors have contributed equally

CONFLICT OF INTERESTS

Declared none

REFERENCES

1. Ajani JA, D'Amico TA, Almhanna K, Bentrem DJ, Chao J, Das P. Gastric cancer. version 3.2016, NCCN clinical practice guidelines in oncology. *J Natl Compr Canc Netw.* 2016;14(10):1286-312.
2. Japanese Gastric Cancer Association. 5th ed. Japanese gastric cancer treatment guidelines. *Gastric Cancer.* 2018;24(1):1-21.
3. Lordick F, Mariette C, Haustermans K, Obermannova R, Arnold D, ESMO guidelines committee. Oesophageal cancer: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. *Ann Oncol.* 2016;27Suppl 5:50-7. doi: 10.1093/annonc/mdw329, PMID 27664261.
4. Cunningham D, Allum WH, Stenning SP, Thompson JN, Van de Velde CJ, Nicolson M. Perioperative chemotherapy versus surgery alone for resectable gastroesophageal cancer. *N Engl J Med.* 2006;355(1):11-20. doi: 10.1056/NEJMoa055531, PMID 16822992.
5. Washington K. 7th edition of the AJCC cancer staging manual: stomach. *Annals of Surgical Oncology.* 7th ed. 2010;17(12):3077-9. doi: 10.1245/s10434-010-1362-z, PMID 20882416.
6. Japanese Gastric Cancer Association. English edition. Gastric Cancer. Japanese classification of gastric carcinoma: 3rd. 2011;14(2):101-12.
7. Ychou M, Boige V, Pignon JP, Conroy T, Bouche O, Lebreton G. Perioperative chemotherapy compared with surgery alone for resectable gastroesophageal adenocarcinoma: an FNCLCC and FFCD multicenter phase III trial. *J Clin Oncol.* 2011;29(13):1715-21. doi: 10.1200/JCO.2010.33.0597, PMID 21444866.
8. Smyth EC, Verheij M, Allum W, Cunningham D, Cervantes A, Arnold D. Gastric cancer: ESMO clinical practice guidelines for diagnosis, treatment and follow-up. *Ann Oncol.* 2016;27Suppl 5:v38-49. doi: 10.1093/annonc/mdw350, PMID 27664260.
9. Ajani JA, D'Amico TA, Almhanna K. Gastric cancer. version 3.2016, NCCN clinical practice guidelines in oncology. *J Natl Compr Canc Netw.* 2016;14(10):1286-312. doi: 10.6004/jnccn.2016.0137.