Austin Medical Sciences

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Research Article

MDCT Angiography Evaluation of Arterial Involvement in Carcinoma Gall Bladder: An Institutional Experience

Raj G, Singh N, Kaushik N, Singh B* and Raj R
Department of Radiodiagnosis, Dr. Ram Manohar Lohiya Institute of Medical Sciences, Lucknow, Uttar Pradesh, India

***Corresponding author:** Bhanupriya Singh, Assistant Professor, Department of Radiodiagnosis, Dr. Ram Manohar Lohiya Institute of Medical Sciences, Lucknow, UP, India

Received: August 05, 2021; **Accepted:** August 19, 2021; **Published:** August 26, 2021

Abstract

Purpose: Evaluation of pattern of arterial involvement in advance case of gallbladder carcinoma with MDCT Angiography.

Method: All CT examinations were performed on a 64- MDCT scanner (Philips Medical System Version 6.4, Extended Brilliance Workspace). Technical features of MSCT were as following 64mm × 1mm collimation, minimum slice thickness of 0.625, gantry rotation time of 320ms, kV of 120, and mAs of 320. CT Angiography was performed with IV administration of nonionic contrast material i.e. omnipaque. The contrast medium and saline solution were injected with a medrad power injector at 4mL/sec through an 18-gauge plastic intravenous catheter placed in an antecubital vein in most of the cases. Contrast medium volumes varied between 100 and 150 mL at 1.5ml/Kg. Images were obtained in triphasic pattern at arterial (20-30 seconds), portal (60-70 seconds), and equilibrium (at 3 minutes) phases.

Results: Nearly half of the cases (43.5%) of carcinoma gall bladder showed arterial involvement at the time of diagnosis; most commonly involved artery was found to be cholecystic artery (24.7%) followed by right hepatic artery (14.1%) and replaced right hepatic artery (3.5%).

Conclusion: We conclude that nearly half of the patients with carcinoma gall bladder have arterial involvement at the time of diagnosis. The most commonly artery involved was Cholecystic artery followed by right hepatic artery and replaced right hepatic artery.

Keywords: MDCT (Multidetector computed tomography); Carcinoma gall bladder; Cholecystic artery; Hepatic artery; Right hepatic artery

Introduction

Gallbladder cancer is the sixth gastrointestinal tract cancer and one of the most common biliary cancers. Among various cancers of the gastrointestinal tract, it has a variety of incidence; with an annual rate of 2.2 per 100000 people, worldwide [1]. India is a high incidence area for Gallbladder Cancer (GBC) and contributes to about 10% of the global GBC burden [2]. GBC incidence shows striking geographical variation in India .Within India, the states such as Assam and Delhi showed highest rate compared to South India [3].

Most patients often present late in the course of the disease either due to non-specific symptoms or lack of resources precluding early curative resection, with the curative resection rate ranging between 10-30 % [4-6]. With the advances in the field of imaging and use of MDCT, accuracy for preoperative diagnosis and staging has improved significantly with accuracy of up to 84% in determining local extent or the T stage of primary gallbladder carcinoma [7] and 85% in predicting resectability through its ability to delineate hepatic and vascular invasion, lymphadenopathy, and distant metastases [8].

To our knowledge, role of MDCT angiography for the evaluation of pattern of arterial involvement in advance case of gallbladder carcinoma has not been explored. The purpose of our study is to assess the presence of arterial involvement and its pattern in cases with carcinoma gall bladder.

Subject and Methods

From January 2018 to June 2019, Eighty-eight patients suspected with gall bladder carcinoma on the basis of clinical history and ultrasonography underwent triphasic CT angiography.

CT technique

All CT examinations were performed on a 64- MDCT scanner (Philips Medical System Version 6.4, Extended Brilliance Workspace). Technical features of MSCT were as following 64mm × 1mm collimation, minimum slice thickness of 0.625, gantry rotation time of 320ms, kV of 120, and mAs of 320. The patients were kept fasting for 4-6 hr. After acquiring non-enhanced liver images, CTA was performed with IV administration of nonionic contrast material i.e. omnipaque. The contrast medium and saline solution were injected with a medrad power injector at 3mL/sec through an 18-gauge plastic intravenous catheter placed in an antecubital vein in most of the cases. Contrast medium volumes varied between 100mL and 150mL at 1.5ml/Kg. Water (~1500ml in a duration of approximately 30 minutes and 500ml on table administration) was administered to all patients as a nonopaque oral contrast agent. Images were obtained in triphasic pattern at arterial (20-30 seconds), portal (60-70 seconds), and equilibrium (at 3 minutes) phases.

Image interpretation

MDCT images were processed and analysed with multiplanar

Citation: Raj G, Singh N, Kaushik N, Singh B and Raj R. MDCT Angiography Evaluation of Arterial Involvement in Carcinoma Gall Bladder: An Institutional Experience. Austin Med Sci. 2021; 6(2): 1050.

reformation, maximum intensity projection, and volume rendering at the available workstation. Images were analysed for arterial involvement on the basis of tumoral vascular interface, irregularity of vessel wall and vascular attenuation and vessel encasement on both axial and 3D volume rendered images.

Observation

Arterial involvement was assessed in 85 patients and could not be evaluated in 3 cases owing to the motion artifact. Arterial involvement was seen in 42% (n=36) of them.

The pattern of arterial involvement was analysed (Figure 1). Involvement of cholecystic artery was seen in 24.7% (21) cases and was most common (Figure 2 and 3).

Right hepatic artery was second most commonly involved artery seen in 14.1% (12) (Figure 4 and 5) and involvement of replaced RHA was seen in 3.5% (3) cases (Figure 6a and 6b).

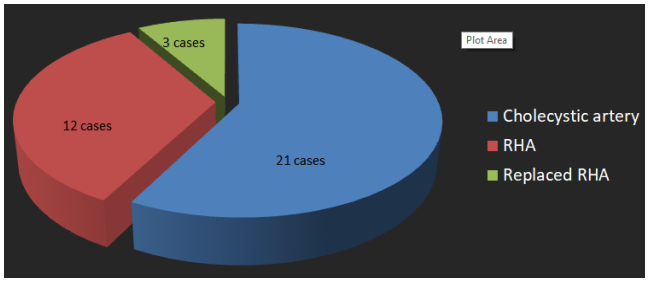

Figure 1: Pattern of involvement seen in the study.

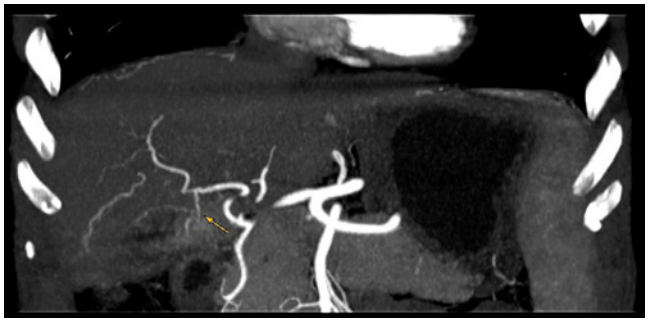

Figure 2: Coronal MIP images showing Cholecystic artery involvement.

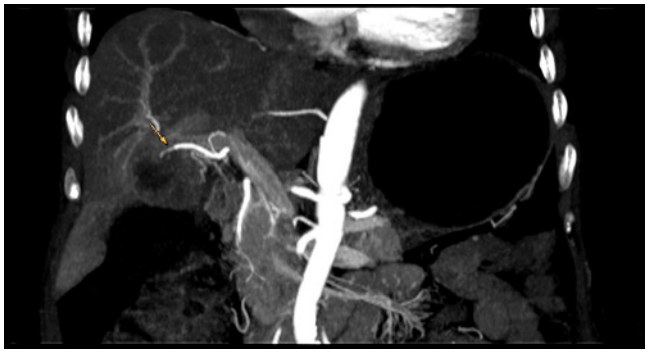

Figure 3: Coronal MIP images showing Cholecystic artery involvement.

Figure 4: Axial MIP images showing arterial involvement of RHA (black arrow) causing focal absence of contrast enhancement (yellow arrow).

Figure 5: Axial MIP images showing involvement of Right hepatic artery (yellow arrow). Also labelled are the celiac trunk (black arrow), splenic artery (orange arrow) and CHA (blue arrow).

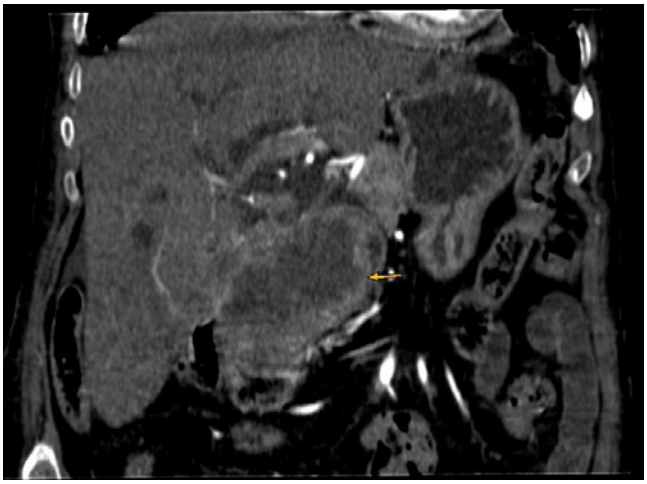

Figure 6a: Coronal image showing Gall bladder carcinoma (arrow).

Discussion

The documentation about pattern of arterial involvement could not be found in literature.

Figure 6b: Coronal Maximum Intensity Projection Images showing involvement of Replaced RHA (yellow arrow) arising from SMA (black arrow). Branches of Celiac axis seen separately (blue, red and orange arrows).

As expected, cholecystic artery was the most common artery involved in Gallbladder cancer, followed by right hepatic artery and replaced right hepatic artery.

As most of the cases are investigated and diagnosed late in the course of gallbladder cancer, the pattern of arterial involvement is important for treating oncosurgeon.

Conclusion

We conclude that nearly half of the patients with carcinoma gall bladder have arterial involvement at the time of diagnosis. The most commonly artery involved was Cholecystic artery followed by right hepatic artery and replaced right hepatic artery.

References

1. N Mahdavifar, M Mohammadian, H Salehiniya. Gallbladder cancer in the world: epidemiology, incidence, mortality and risk factors. World Cancer Research Journal. 2018; 5: e1124.
2. Dutta U, Bush Noted, Kalsi D, Popli P, Kapoor VK. Epidemiology of gallbladder cancer in India. Chinese Clinical Oncology. 2019; 8: 33.
3. Phadke PR, Mhatre SS, Budukh AM, Dikshit RP. Trends in gall bladder cancer incidence in the high- and low-risk regions of India. Indian Journal of Medical and Paediatric Oncology. 2019; 40: 90-93.
4. Njei B, Rotman Y, Ditah I, Lim JK. Emerging trends in hepatocellular carcinoma incidence and mortality. Hepatology. 2015; 61: 191-199.
5. Acharya SK. Epidemiology of hepatocellular carcinoma in India. J Clin Exp Hepatol. 2014; 4: S27-S33.
6. Kumar R, Saraswat MK, Sharma BC, et al. Characteristics of hepatocellular carcinoma in India: a retrospective analysis of 191 cases. QJM. 2008; 101: 479-485.
7. Soo Jin Kim, Jeong Min Lee, Jae Young Lee, Jin Young Choi, Se Hyung Kim, Joon Koo Han, et al. Accuracy of Preoperative T-Staging of Gallbladder Carcinoma Using MDCT. American Journal of Roentgenology. 2008; 190: 74-80.
8. Naveen Kalra, Sudha Suri, Rajesh Gupta, SK Natarajan, Niranjan Khandelwal, JD Wig, et al. MDCT in the Staging of Gallbladder Carcinoma. American Journal of Roentgenology. 2006; 186: 758-762.