International Surgery Journal
Vidyasagar et al. Int Surg J. 2019 Apr;6(4):1376-1379
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20191281

Original Research Article

Role of digital photography in evaluation of gallbladder specimens following laparoscopic cholecystectomy for gallstone disease: a prospective observational study

Vidyasagar, Manjunath Maruti Pol*, Sunil Chumber, Yashwant Singh Rathor

Department of Surgical Disciplines, All India Institute of Medical Sciences, AIIMS, New Delhi, Delhi, India

Received: 07 February 2019
Accepted: 09 March 2019

***Correspondence:**
Dr. Manjunath Maruti Pol,
E-mail: manjunath.pol@gmail.com

ABSTRACT

Background: Digital photography helps in accurate documentation of macroscopic features of specimens and preventing inaccuracies in description of macroscopic features. Some studies recommend a digital color print be sent with each specimen to histopathology laboratory. The aim of the study was to assess the necessity of histopathological examination of resected specimen of gallbladder with no features suspicious of carcinoma gall bladder on clinicoradiological study.
Methods: It is a prospective observational study conducted in the Department of Surgical Disciplines, All India Institute of Medical Sciences, New Delhi, between 2014 and 2016. Patients between 18 to 60 years of age with gall stone disease with no features suspicious of carcinoma gall bladder on clinicoradiological study were recruited in the study. Post-cholecystectomy gallbladder specimens were considered as subjects of study. Specimen were photographed and sent for histopathological examination. Macroscopic features on digital photography were compared with histopathological findings.
Results: About, 39/100 (39%) gallbladder specimens showed abnormal findings on digital photography; 30/39 (77%) had ulcerations, 5/39 (13%) had polypoidal lesions and 4/39 (10%) had diffuse wall thickening. 1/39 (2.6%) specimens with abnormal finding on digital photography was found to be malignant on histopathological examination. The sensitivity, specificity, negative predictive value and positive predictive value of digital photography was 100%, 67.7%, 100% and 3.03% respectively.
Conclusions: Digital photography can prove to be a good tool in documenting macroscopic features of gallbladder specimens. Digital photography is associated with high sensitivity and negative predictive value; however, larger sample size is required to establish its significant correlation.

Keywords: Digital photography, Cholecystectomy, Carcinoma gall bladder

INTRODUCTION

Carcinoma gallbladder (CAGB) is the fifth most common neoplasm of the gastrointestinal tract and the most common cancer of the biliary tract. Moreover, there is a strong association between cholelithiasis and CAGB.[1]

The Incidence of incidental CAGB is 0.2 – 3%.[2] In order not to miss a patient with incidental CAGB, there is a practice of sending every specimen of gall bladder routinely for histopathological examination (HPE) following laparoscopic cholecystectomy. Hence, a pathologist will have to examine several specimens leading to unnecessary burden on pathologist along with wastage of resources.

To avoid burden of the pathologist and wastage of financial resources there is need for a screening method

that can be used to send selective gallbladder specimens for HPE. Several studies show that in patients reported as incidental CAGB, there were abnormal macroscopic features on specimen examination.

Digital photography (DP) is a form of photography that uses cameras containing arrays of electronic photo detectors to capture images focused by a lens. Gross description of specimen includes how the lesion looked like, where it occurred and how they were distributed. DP of specimens helps in guiding accurate site for HPE by documenting the true site of suspicious lesion; thus, it improves the ability to orient specimen correctly, increases the accuracy and reproducibility of macroscopic findings.[3] Some studies strongly recommend a digital color print be sent with each specimen to histopathology laboratory.[3]

In several separate studies mentioned in the world literature, patients who were detected to have carcinoma after histopathology had visible macroscopic abnormal findings.[4-6] Digital photography helps in accurate documentation of macroscopic features of specimens and if these features correlate with histopathology report then it can decide which specimen requires a further histopathological examination as screening method.

METHODS

A prospective observational study was conducted during a period of 2 years from 2014 to 2016 at All India Institute of Medical Sciences. Patients included in this study were between 18years to 60 years of age group with ultrasonography (USG) abdomen showing gallstones with no features suspicious of CAGB. Patients aged less than 18 years and more than 60 years of age or USG abdomen showing features suspicious of malignancy were excluded from this study. Patients refusing to participate were excluded from the study. Suspicious features of malignancy on USG in this study were ulceration, diffuse wall thickening of GB, polyp, tumor, nodule or growth in GB. A written informed consent was taken from all these patients prior to the surgery. All patients underwent laparoscopic cholecystectomy.

After laparoscopic cholecystectomy, the specimen photograph and two-dimensional measurement were taken by keeping specimen on photographic stand using Nikon coolpix 60x optical zoom camera under appropriate light on a green back ground. Appropriate labeling with patient UHID was done.

Photographs were taken in the following order: Intact specimen, specimen cut-open inner view and specimen cut-open outer view. Features suspicious for CAGB on DP were recorded viz., asymmetrical wall thickening of gallbladder, tumor or nodule or polypoid or papillary lesion and ulceration. The specimens that showed any of the features mentioned above were labeled as suspicious for malignancy and specimens that did not show any of these features were labeled as non-suspicious for malignancy. After DP, all the specimens were sent to pathology laboratory for HPE. Subsequently, the pathology reports of all the specimen were collected, and their findings were compared with respect to the gross findings of DP.

RESULTS

About 100/540 patient's participated in the study. Among these, 80% were men and 20% were women. The mean age was 41.6 years. Ultrasound abdomen reports of all the patients were suggestive of gallstone disease (GSD) with normal wall thickness, no nodule or tumor or polypoid lesion. On DP, 39 specimens showed suspicious lesion for CAGB (Table 1); 30/39 specimens showed ulceration, 5/39 specimens showed polypoidal or papillary lesions and 4/39 specimen showed diffuse wall thickening.

Table 1: Co-relation of various digital photographic findings with malignancy.

Digital photographic feature	Number (n=100)	Malignancy (n=1)
No macroscopic abnormality	61	0
Ulceration	30	0
Polypoid/ papillary lesions	5	1
Diffuse wall thickening	4	0
Tumor/nodule/growth	0	0

Table 2: Digital photography as predictor of malignancy in the gall bladder with clinico-radiologically negative for malignancy.

Measure	% of specimen [95% Confidence Interval]
Sensitivity	100
Specificity	67.7
Positive predictive value	3.03
Negative predictive value	100

On HPE, 99/100 specimens showed features suggestive of chronic cholecystitis. CAGB was reported in 1/100 specimen and pyloric metaplasia was reported in 22/100 specimens. The sensitivity, specificity, negative predictive value and positive predictive value was 100%, 67.7%, 100% and 3.03% respectively (Table 2).

The patient in whom gallbladder cancer was reported was a 40-year-old male. His preoperative USG of abdomen was suggestive of distended gallbladder with multiple stones and normal wall thickness. No nodule or tumor or polyp or tumor was noted. He underwent laparoscopic cholecystectomy. Digital photography of the specimen showed focal papillary projections and the histo-

pathological examination revealed well differentiated adenocarcinoma T2 stage. Later this patient underwent extended cholecystectomy within 1 month.

DISCUSSION

Photographs capture unbiased appearances of pathological changes and may reduce many of the inaccuracies resulting from discrepancies in descriptive ability.[7] Each specimen is unique and thus requires variation in description.[8] This makes the accurate description and interpretation of the findings critical. Proper gross description, with accompanying gross photographs, provides a permanent, written and legal documentation of the medical problems of the patient.[9]

The first major advantage of DP is that the photographs would remains as a permanent record for research, academic, legal review and interpretation.[9] The development of DP and the rapidly decreasing costs of good quality digital cameras is cost effective method and has a major impact on our traditional way of documenting pathological findings at both the gross and microscopic finding. Digital images permit the image quality and content to be assessed at the time of capture, have no developing delays or costs, can be easily duplicated, and facilitate image storage, cataloguing, retrieval, sharing and applications.[10,11]

Digital pathology images consist of either gross (macro) photos or microphotography (histologic photography). The distinction in pathology between the two is quite clear. Gross digital pathology would refer to digital photographs of organs, organ systems or the entire patient.

In 39/100 gallbladder specimens were labeled as suspicious for CAGB and 61/100 specimens were labeled as non-suspicious for CAGB by using DP. About 99/100 gallbladder specimens were reported as chronic cholecystitis on histopathology. Apart from this we also noticed 30/39 had ulcerations, 4/39 had polypoidal lesions and 4/39 specimens had diffuse wall thickening in specimens on DP. Out of the 39 Gallbladder specimens which had features suspicious for malignancy on DP, one was reported as CAGB on HPE. However, Gall bladder cancer was not reported in any of the specimens which were labeled non-suspicious for malignancy on DP.

To detect incidental gallbladder carcinoma the current practice is to send every gallbladder specimen following cholecystectomy for histopathological examination.[12-15] The Royal College of Pathologists recommends routine histopathological examination of all gallbladder specimens.[16] However, study by Bazoua et al recommends use of selective histopathology for gallbladder specimens following cholecystectomy.[5]

The studies that recommends selective histopathological examination of gallbladder specimens following cholecystectomy is based on their observation of abnormal macroscopic features on gross examination of GB specimen. Dix et al demonstrated abnormal macroscopic features on gross examination in 5 specimens which were reported as malignant out of 1308 GB specimens. Bazoua et al also found abnormal macroscopic features in 5 specimens of gallbladder malignancy out of 2890 specimens. Darmas et al concluded that selective histopathological examination of gallbladder specimens would be cost effective and would not miss malignancy.[17] Taylor et al also supported selective histopathology.[18]

There is a concern of dysplasia and early mucosal gallbladder carcinoma in specimens which were normal on gross examination, however a simple cholecystectomy is considered curative for these cases and radical resections do not increase survival.[19,20] This group of patients would have received appropriate treatment by a simple cholecystectomy, and do not require further intervention.

Our study suggests that using DP screening we can avoid sending specimens which were non-suspicious for malignancy for HPE that would further help in decreasing workload on pathologists and wastage of resources. Moreover, DP had a correlation with histopathology in a specimen which was reported as malignant in our study. However, to look for correlation a study with a larger sample size is required. If this association proves significant then DP can serve as a good screening tool in deciding the requirement of HPE for a given specimen.

CONCLUSION

Digital photography can prove to be a good tool in evaluation of gallbladder specimens following laparoscopic cholecystectomy for documenting macroscopic features. As no malignancy was found in specimens that had non-suspicious finding on DP, one may avoid sending these specimens for histopathology. Digital photography showed a good correlation with histopathology in our study; however, larger sample size is required to establish its statistical significance.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Lillemoe KD. Sleisenger and Fordtran's, Tumors of the gallbladder, bile ducts, and ampulla, Gastrointestinal and Liver Diseases. Philadelphia, Pennsylvania: Saunders; 2006: 1487–1502.
2. Duffy A, Capanu M, Abou-Alfa GK, Huitzil D, Jarnagin W, Fong Y, et al. Gallbladder Cancer (GBC): 10-year Experience at Memorial Sloan-

Kettering Cancer Centre (MSKCC). J Surg Oncol. 2008;98(7):485-9
3. Leong FJ, Leong AS. Digital photography in anatomical pathology. J Postgrad Med. 2004;50:62-9.
4. Dix FP, Bruce IA, Krypcyzk A, Ravi S. A selective approach to histopathology of the Gallbladder Is Justifiable. Surgeon. 2003;1(4):233-5.
5. Bazoua G, Hamza N, Lazim T. Do We Need Histology for a Normal-looking Gallbladder? J Hepatobiliary Pancreat Surg. 2007;14(6):564-8.
6. Mittal R, Jesudason MR, Nayak S. Selective histopathology in cholecystectomy of gallstone disease. Indian J Gastroenterol. 2010;29(5):211.
7. Leong FJ, Leong AS. Digital imaging in pathology: theoretical and practical considerations, and applications. Pathology, 2004;36:234-41.
8. Cruz D, Seixas M. A surgical pathology system for gross specimen examination. Procedings of the AMIA Symposium. 1999: 236-240
9. Stromberg. Fundamental Principles of Descriptive Anatomic Pathology (How to Describe and Interpret What You See), in Charles Louis Davis Foundation for the Advancement of Veterinary and Comparative Pathology, 2007.
10. Gabril MY, Yousef GM. Informatics for practicing anatomical pathologists: marking a new era in pathology practice. Modern Pathology. 2010;23:349-58.
11. Parwani AV. Digital Imaging, in Pathology Informatics: Theory & Practice. Am Society Clin Pathol. 2012: 231-256.
12. Yamamoto H, Hayakawa N, Kitagawa Y, Katohno Y, Sasaya T, Takara D, et al. Unsuspected gallbladder carcinoma after laparoscopic cholecystectomy. J Hepatobiliary Pancreat Surg. 2005; 12:391–8.
13. Tantia O, Jain M, Khanna S, Sen B. Incidental carcinoma gallbladder during laparoscopic cholecystectomy for symptomatic gallstone disease. Surg Endosc. 2009;23:2041–6.
14. Kraas E, Frauenschuh D, Farke S. Intraoperative suspicion of gallbladder carcinoma in laparoscopic surgery: what to do? Dig Surg. 2002;19:489–93.
15. Samad A. Gallbladder carcinoma in patients undergoing cholecystectomy for cholelithiasis. J Pak Med Assoc 2005;55:497–9.
16. Histopathology and cytopathology of limited or no clinical value. Report of working group of The Royal College of Pathologists, 2nd edition London: Royal College of Pathologists, 2005.
17. Darmas B. Is There Any Justification for the Routine Histological Examination of Straightforward Cholecystectomy Specimens? Ann R Coll Surg Engl. 2007;89(3):238–41.
18. Taylor HW. 'Routine' pathological examination of the gallbladder is a futile exercise. Br J Surg. 1998;85:208.
19. You DD. What is an adequate extent of resection for T1 gallbladder cancers? Ann Surg. 2008;247:835–8.
20. Lai CH. Gallbladder cancer - a comprehensive review. Surgeon. 2008;6:101–10.

Cite this article as: Vidyasagar, Pol MM, Chumber S, Rathor YS. Role of digital photography in evaluation of gallbladder specimens following laparoscopic cholecystectomy for gallstone disease: a prospective observational study. Int Surg J 2019;6:1376-9.