

Ultrasound-Guided Fine Needle Aspiration Cytology of Gall Bladder Lesions: An Institutional Experience

Shuchismita¹, Anju Singh², Bipin Kumar³, Ruchi Gupta⁴

¹. Ex Assistant Professor, Department of Pathology, Indira Gandhi Institute of Medical Sciences, Patna.

². Additional Professor, Department of Pathology, Indira Gandhi Institute of Medical Sciences, Patna.

³. Professor and Head, Department of Pathology, Indira Gandhi Institute of Medical Sciences, Patna.

⁴. Assistant Professor, Department of Radiodiagnosis, Indira Gandhi Institute of Medical Sciences, Patna.

Corresponding Author: Shuchismita

Abstract

Background and objectives: Gallbladder (GB) carcinoma is prevalent in the Gangetic plains of the Eastern Uttar Pradesh and Western Bihar regions of India. The present study was done to assess the utility of ultrasound (US) guided fine needle aspiration (FNA) in diagnosing GB carcinoma.

Materials and Methods: A study was conducted over a period of one year from August 2017 to July 2018 in the Department of Pathology and Department of Radiodiagnosis in Indira Gandhi Institute of Medical Sciences, Patna. US guided fine needle aspiration was carried out, and aspirates were drawn, processed and evaluated.

Results: Out of 117 aspirations, 93 (79.4%) were adequate, 15 (12.8%) were inconclusive, and 9 (7.6%) were inadequate. The most common carcinoma was adenocarcinoma in 75 cases (64.1%). The overall diagnostic adequacy was 92.4%. The common causes of inconclusive cases were necrotic areas, aspiration of reactive hepatocytes adjacent to the GB mass, scant epithelial cells, inflammatory cells and mucus flakes. Histopathology of the GB was available in 24 cases.

Conclusion: US guided FNA of gall bladder lesions is a simple, safe, economically prudent technique leading to quick and early diagnosis.

Keywords: Gall bladder carcinoma, Gall bladder mass, Mural thickening, US guided FNA.

Date of Submission: 16-01-2019

Date of acceptance: 02-02-2019

I. Introduction

Gallbladder (GB) carcinoma is prevalent in the Gangetic plains of the Eastern Uttar Pradesh and Western Bihar regions of India. It is 5th most common gastrointestinal cancer worldwide.¹ In the United States, gallbladder cancer is relatively rare, affecting fewer than 5000 people per year.² Incidence is very high among the American-Indian and Chilean-Mapuche populations, as well as in the Northern India.³ The age adjusted incidence rates of gall bladder cancer is highest in Chile, followed by Assam in India.⁴

It affects females upto 5 times more commonly than males and its incidence increases with age.⁵ Most of the patients present in advanced stages as there is no specific signs and symptoms and are not resectable. The disease has an insidiously rapid course of spread because gallbladder is adjacent to the liver. The mean 5-year survival is about 1% despite surgical intervention.³

Ultrasonography is rapid, inexpensive, versatile method and there is no requirement of contrast medium and ionising radiation.⁶ US guided FNA is a common practice in space occupying masses of abdomen. Now a days, it is used as a diagnostic tool in FNA of abdominal organs. Thus, image guided FNA helps us in quick diagnosis and avoids unresectable stage of tumor. In the present study, we have evaluated the accuracy of FNAC with US findings for GB lesions.

II. Material And Methods

A study was conducted over a period of one year from August 2017 to July 2018 in the Department of Pathology and Department of Radiodiagnosis in Indira Gandhi Institute of Medical Sciences, Patna. Aspiration smears from the cases of gall bladder masses aspirated under ultrasonography guidance were received in the cytology section of department of pathology for cytological evaluation.

Most patients presented with right hypochondrial mass and varying clinical features like pain in the abdomen, jaundice, loss of weight and appetite. After obtaining written consent, the patients were subjected to ultrasonography for identification of lesion and site assessment. US findings revealed either a GB mass or wall thickening. Once a suitable site was selected, the overlying skin was cleaned and draped. Local anaesthetic (2% xylocaine) was infiltrated at the site of puncture. Percutaneous transhepatic aspiration was performed using 22-

23G needle and 10 mL disposable syringe. Multiple passes were made under imaging guidance to increase the adequacy of the sample. All the patients in whom initial aspiration failed, repeat US-guided aspiration was done. The aspirated material was expelled into the clean glass slides and smears were prepared. Air-dried smears were fixed in methanol for 20–30 minutes and then stained with May – Grunwald Giemsa stain. After drying, the smears were mounted with DPX and then evaluated under the microscope.

After subsequent to cytology, the patients in whom tumor was resectable underwent surgery. Tissue obtained after surgery was evaluated by histopathology. Those patients who were inoperable including patients with metastases in liver were sent for chemoradiation.

III. Results

A total of 117 fine needle aspiration smears from gall bladder masses aspirated under ultrasonography guidance were received in the cytology section of department of pathology for cytological evaluation.

A total of 117 aspirates were performed, out of which 28 (23.9%) were males and 89 (76.1%) were females. (Table I)

Table 1: Sex distribution of patients (n=117)

Sex	Number	Percentage
Male	28	23.9%
Female	89	76.1%

The age of the patients in the present study varied from 26 years to 87 years. 9 Groups were made from 0 – 10 years to 81 – 90 years. (Table II) The maximum number of 49 cases (41.8%) lay in the age group of 41 – 50 years, followed by 29 cases (24.7%) in the age group of 51 – 60 years.

Table II: Distribution of cases according to age in various age groups (n=117)

S. No.	Age Group	No. of Cases	Percentage
1.	0 – 10	00	0.0
2.	11 – 20	00	0.0
3.	21 – 30	05	4.2
4.	31 – 40	11	9.4
5.	41 – 50	49	41.8
6.	51 – 60	29	24.7
7.	61 – 70	14	11.9
8.	71 – 80	09	7.6
9.	81 – 90	00	0.0
	TOTAL	117	100.0

The aspirates were considered adequate if the cytology material were sufficient for rendering the diagnosis. Inconclusive category is due to insufficient number of epithelial cells, inflammatory cells, reactive hepatocytes or necrosis was predominant. The aspirate were labelled as inadequate, due to predominance of mucus flakes or hemorrhage and absence of epithelial cells. (Table III)

Ultrasonography revealed mass/ mural thickening in 107(91.4%) cases and non-specific US findings in 10 (8.5%). Out of the 107 cases, malignancy was cytologically diagnosed in 80(74.7%) cases while 10 (9.3%) cases were inflammatory, 9(8.4%) were inconclusive and 8 (7.4%) cases were inadequate. Of the 10 cases with focal thickening of GB, FNAC showed carcinoma in 1case (10.0%), 2(20.0%) cases were inflammatory, 6 (60.0%) were inconclusive and 1(10.0%) case was inadequate. Thus, out of total 117 cases, cytological examination revealed malignancy in 81 (69.2%) cases, inflammation in 12 (12.8%) cases and 15 (12.8%) cases were inconclusive and 9(7.6%) cases were labeled under the inadequate category.

Table III: Categories of aspiration

Category	No. of aspirate	Percentage
Adequate	93	79.4%
Inconclusive	15	12.8%
Inadequate	9	7.6%
Total	117	100%

Cytological diagnosis offered in adequate fine-needle aspirate is shown in Table IV. In the malignant group, 75 (64.1%) cases were of adenocarcinoma, 2 (1.7%) of adenosquamous carcinoma, 2 (1.7%) cases of squamous cell carcinoma and 2 (1.7%) of neuroendocrine tumor. The smears in cases of adenocarcinoma were characterised by cell aggregates (sheets, acinar, papillary and microacinar groupings), rounded nuclei, prominent nucleoli, clean or mucinous background. Tumor cells in squamous cell carcinoma shows clusters having ragged margin as well as singly scattered, anisochromasia, hyperchromatic nucleus, evidence of keratinisation and necrotic background. Adenosquamous carcinoma showed dual differentiation. In

neuroendocrine tumor the cells were singly scattered and had salt and pepper type of nuclear chromatin. There were 7 cases that were labeled as suspicious of carcinoma but repeat aspiration in all of them proved to be adenocarcinoma.

All the 12 cases cytologically diagnosed as inflammatory lesion showed focal thickening of GB wall on ultrasonography. The aspirate yielded pus and contained large number of intact and degenerated neutrophils with necrotic debris. In three of these cases possibility of xanthogranulomatous cholecystitis was suggested on the basis of sheets of foamy macrophages and inflammatory cells in association with regular arrangement of epithelial cells in sheets and surrounding blood vessels. cytological features were suggestive of chronic cholecystitis in 9 cases and showed scant epithelial cells to sheets of tall columnar cells, nuclei round to oval with fine nuclear chromatin and inconspicuous nucleoli.

Table IV: Distribution of cases according to cytological diagnosis

Cytological diagnosis	Number of cases	Percentage
Non neoplastic		
Chronic cholecystitis	9	7.6%
Xanthogranulomatous cholecystitis	3	2.5%
Neoplastic		
Adenocarcinoma	75	64.1%
Squamous cell carcinoma	2	1.7%
Adenosquamous carcinoma	2	1.7%
Neuroendocrine carcinoma	2	1.7%

Histopathological correlation was possible in 24 cases. Of the 20 cases diagnosed cytologically as adenocarcinoma and 1 case diagnosed as squamous cell carcinoma, histopathology confirmed the diagnosis in all. There was no false positive case. Of the 3 cases diagnosed as inflammatory on cytology; 2 was diagnosed as xanthogranulomatous cholecystitis and 1 as adenocarcinoma on histopathologic examination.

IV. Discussion

Gallbladder cancer is the most common malignancy of the gastrointestinal tract in females and the most common cause of malignant obstructive jaundice in northern India.^{4,7}

In the present study male: female ratio was 1:3.1. Similar studies by Ahmad et al.⁸ showed 1:3.8 ratio, Akosa et al.⁹ showed 1:3 male:female ratio. In our study, the youngest patient of gall bladder lump was a female aged 26 years and the oldest female aged 87 years. Maximum females were in the age groups of 41-50 followed by 51- 60 years. Female preponderance in gall bladder malignancy is reported in studies by Akosa et.al⁹, Gupta et al¹⁰ and Pandey et.al.¹¹.

In this study, the mean age for gall bladder carcinoma was 50.5 years. Study by Zargar et al¹² average age was reported as 53 years, Venkataramu et.al.¹³ reported 52-54 years, Akosa et.al.⁹ reported 6th -7th decade and Pandey et.al.¹¹ reported 49.9 years.

In the present study, out of 117 aspirations, 93 (79.4%) were adequate, 15 (12.8%) were inconclusive, and 9 (7.6%) were inadequate. According to study by Shukla et.al¹⁴, he found 53.3% malignant, 23.3% suspicious, 16.6% inflammatory and 6.6% acellular cases. Similar results were also obtained by Venkataramu et.al¹³ and Zargar et.al¹². According to Ahmad et al.⁸ adenocarcinoma 37.3%, infection and suspicious of malignancy 13.3%, and 3.8% acellular smear. Kumar et al.¹⁵ 79.2% adenocarcinoma, 6.9% suspicious of malignancy, 6.9% chronic cholecystitis, 4.7% xanthogranulomatous lesion, and 2.3% adenoma.

Squamous carcinoma is relatively uncommon in gall bladder.¹⁶ Squamous carcinoma and adenosquamous carcinoma constituted 7% of the cases in the study by Roa et al,¹⁶ whereas in present study 2 cases each of squamous carcinoma and adenosquamous carcinoma was found and together constitutes 3.4% of malignancies. Frierson et al¹⁷ observed adenocarcinoma in 85% of cases, pure squamous carcinoma and adenosquamous carcinoma in 10% and sarcomas in the remaining 5%.

In our study the adequacy of USG guided FNAC of gall bladder was 92.4% whereas the adequacy was 89.4% by Agarwal et al¹⁸ and sensitivity of USG guided FNAC was 94.5% by Pandey et.al.¹¹ US can detect focal or mass lesions in GB and US guided FNA is a valuable tool for preoperative diagnosis and staging of carcinoma as noted in the present study. In a study of 82 cases by Das et al.¹, 55 (67.9%) cases were considered malignant by combined clinical and imaging modalities. Out of 55 cases, 40 (83.3%) were diagnosed malignant on cytology. In the present study out of 107 cases that were detected as GB mass/thickening of wall of GB, 80 (74.7%) cases revealed malignancy on cytology. Of the 10 cases with focal thickening of GB, FNAC showed carcinoma in 1 case (10.0%).

In the present study, there were 7 cases that were labeled as suspicious of carcinoma but repeat aspiration in all of them proved to be adenocarcinoma. During a repeat procedure, sonography allows for selection of a site different from the previous one, which avoids sampling error.¹³

The present study clearly showed that findings suggestive of malignancy in gallbladder aspirates, provided that they are adequate for cytologic evaluation, strongly support the diagnosis of a malignant lesion and obviating the need for laparotomy in cases with advanced stage. However when clinical suspicion is high, negative result should be interpreted with caution and repeat US guided FNAC should be done to establish the conclusive diagnosis.

V. Conclusion

US guided FNAC of gall bladder lesions is an extremely beneficial procedure which furnishes adequate and diagnostic material in the vast majority of subjects without significant complications. Cytodiagnosis alone can be accurate in unresectable and advanced stage for commencing management.

References

- [1]. Das DK, Tripathi RP, Bhambhani S, Chachra KL, Sodhani P, Malhotra V. Ultrasound-guided fine-needle aspiration cytology diagnosis of gallbladder lesions: a study of 82 cases. *Diagn Cytopathol* 8:258–64
- [2]. Hsing AW, Gao YT, Han TQ, et al. Gallstones and the risk of biliary tract cancer: a population-based study in China. *Br. J. Cancer.* 97 (11): 1577–82.
- [3]. Misra S., Chaturvedi A., Misra NC., Sharma and I. D. Carcinoma of the gallbladder. *Lancet Oncol*, 4,167–176.
- [4]. National Cancer Registry Programme (2013). Three-year report of population based cancer registries:2009-2011. NCDIR-ICMR, Bangalore.
- [5]. Lazcano-Ponce EC, Miquel JF, Muñoz N, Herrero R, Ferrecio C, Wistuba II, et al. Epidemiology and molecular pathology of gallbladder cancer. *CA Cancer J Clin* 2001;51:349-64.
- [6]. Porter B, Karp W, Forsberg L: Percutaneous cytodagnosis of abdominal masses of ultrasound guided fine needle aspiration biopsy. *Acta Radiol Diagnosis* 22, Fasc, 1981;6:663-668
- [7]. Sikora SS, Kapoor R, Pradeep R, Kapoor VK, Saxena R, Kaushik SP. Palliative surgical treatment of malignant obstructive jaundice. *Eur J Surg Oncol* 1994; 20:580-584.
- [8]. Ahmad SS, Akhtar K, Akhtar SS, Nasir AAA, Mansoor T. Ultrasound guided FNA biopsy of abdominal masses. *JK Science* 2006;8:200-4.
- [9]. Akosa AB, Barker F, Desa L, Bengamin J, Krantz T. Cytologic diagnosis in the management of GB CA. *Acta Cytol* 1995;39:494-98.
- [10]. Gupta SC, Vatsala M, Singh PA, Anu R, Misra SP, Gupta AK: Gall stones and carcinoma gall bladder. *Indian J. Pathol. Microbiol.* 2000; 43(1) :147-154
- [11]. Pandey M, Alok KP, Amitabh G, Nakul CA, Vijay KS: Carcinoma of the gall bladder. A retrospective review of 99 cases. *Digestive diseases and sciences* 2001;46(6):1145-1151.
- [12]. Zargar SA, Khuroo MS, Mahajan R, Jan GM, Sham P: US guided fine needle aspiration biopsy of gall bladder masses. *Interventional Radiology*, 1991; 179(1):275-278.
- [13]. Venkataramu NK, Sood BP, Gupta S, Gulati M, Khandelwal N, Suri S: Ultrasound guided fine needle aspiration biopsy of gall bladder malignancies. *Acta Radiol.* 1999; 40:436-43.
- [14]. Shukla VK, Pandey M, Mumar M, et al: Ultrasound guided fine needle aspiration cytology of malignant gall bladder masses. *Acta Cytol.* 1997;41:1654.
- [15]. Kumar N, Singhal P, Agarwal A, Khan MA. Cytopathological diagnosis of GB mass and mural thickening based on imaging findings – A prospective study of 51 cases. *J Cytol* 2015;32:234-7.
- [16]. Roa JC, Tapia O, Cakir A, Basturk O, Dursun N, Akdemir D. et al. Squamous cell and adenosquamous carcinomas of the gallbladder: Clinicopathological analysis of 34 cases identified in 606 carcinomas. *Mod Pathol* 2011;24:1069-78
- [17]. Frierson HF, Fechner RE (1987) Pathology of malignant neoplasms of the gallbladder and extrahepatic bile ducts. In: *Hepatic and biliary cancer*. Wanebo HJ, (Ed.), New York: Marcel Dekker; 281–297
- [18]. Agarwal P, Ahmad S. Ultrasound guided Fine Needle Aspiration cytology of Hepatobiliary and Pancreatic lesions. *Asian Pac. J. HealthSci.*, 2016;3(4):1-10

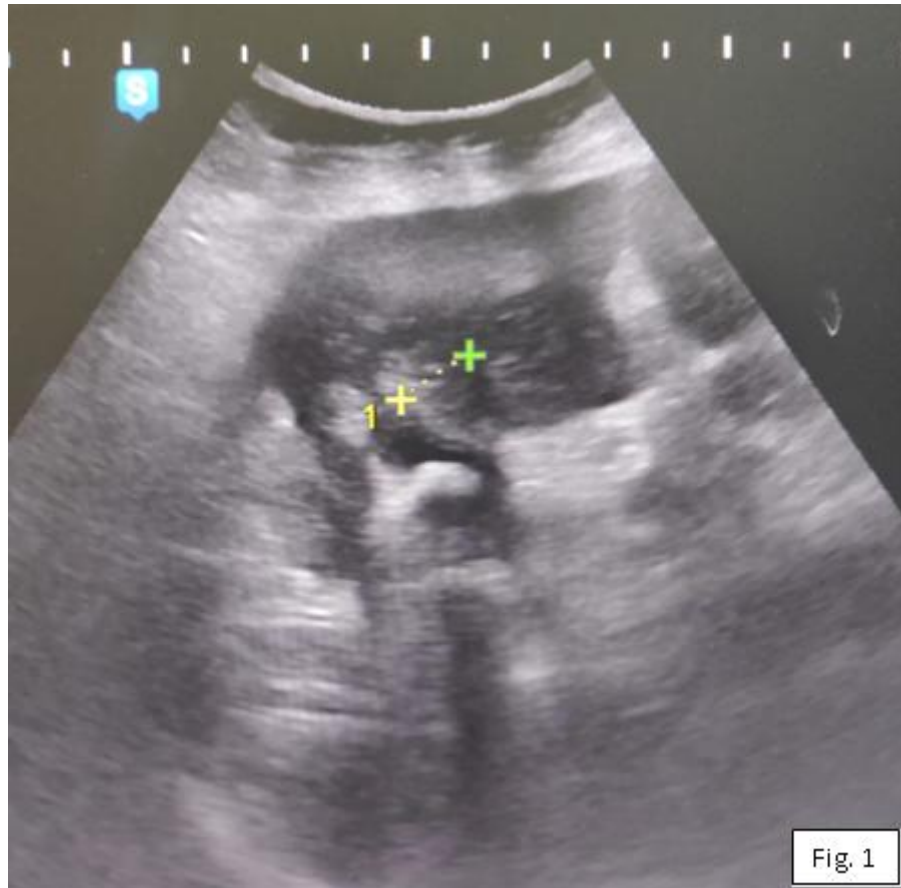


Fig. 1

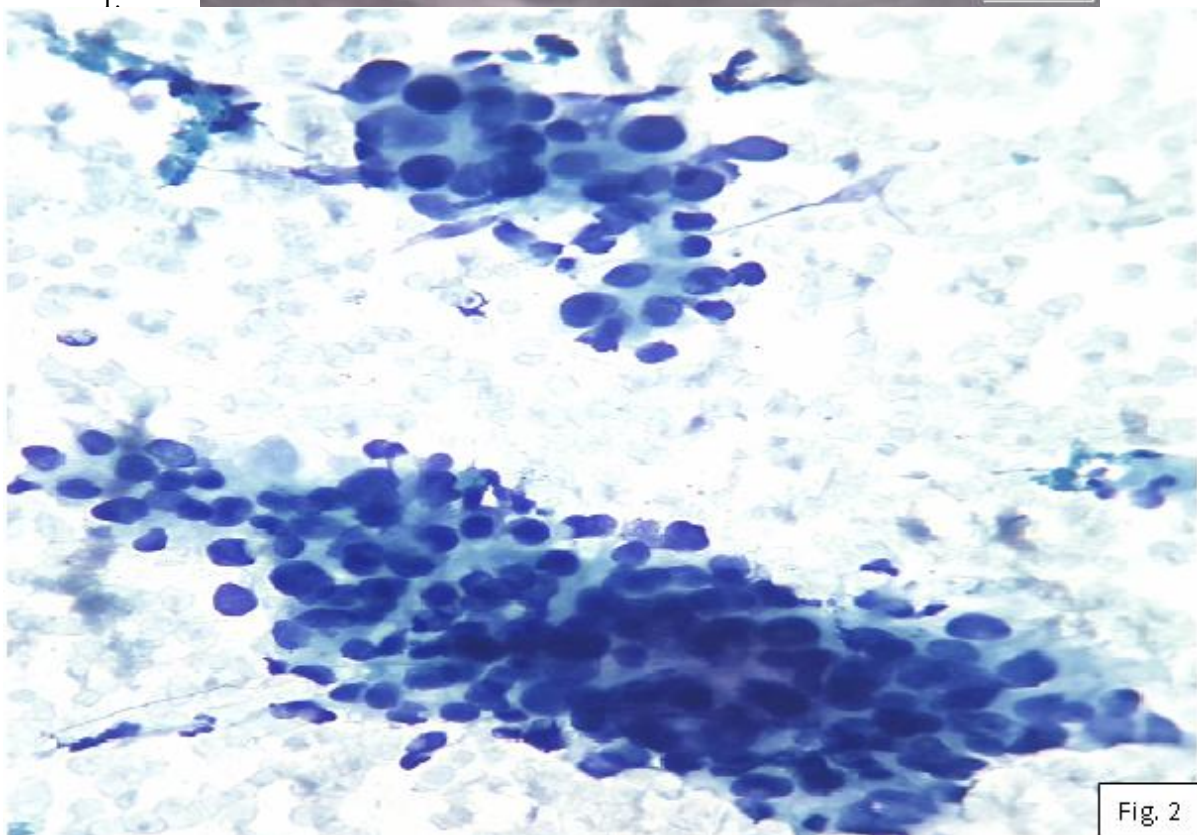


Fig. 2

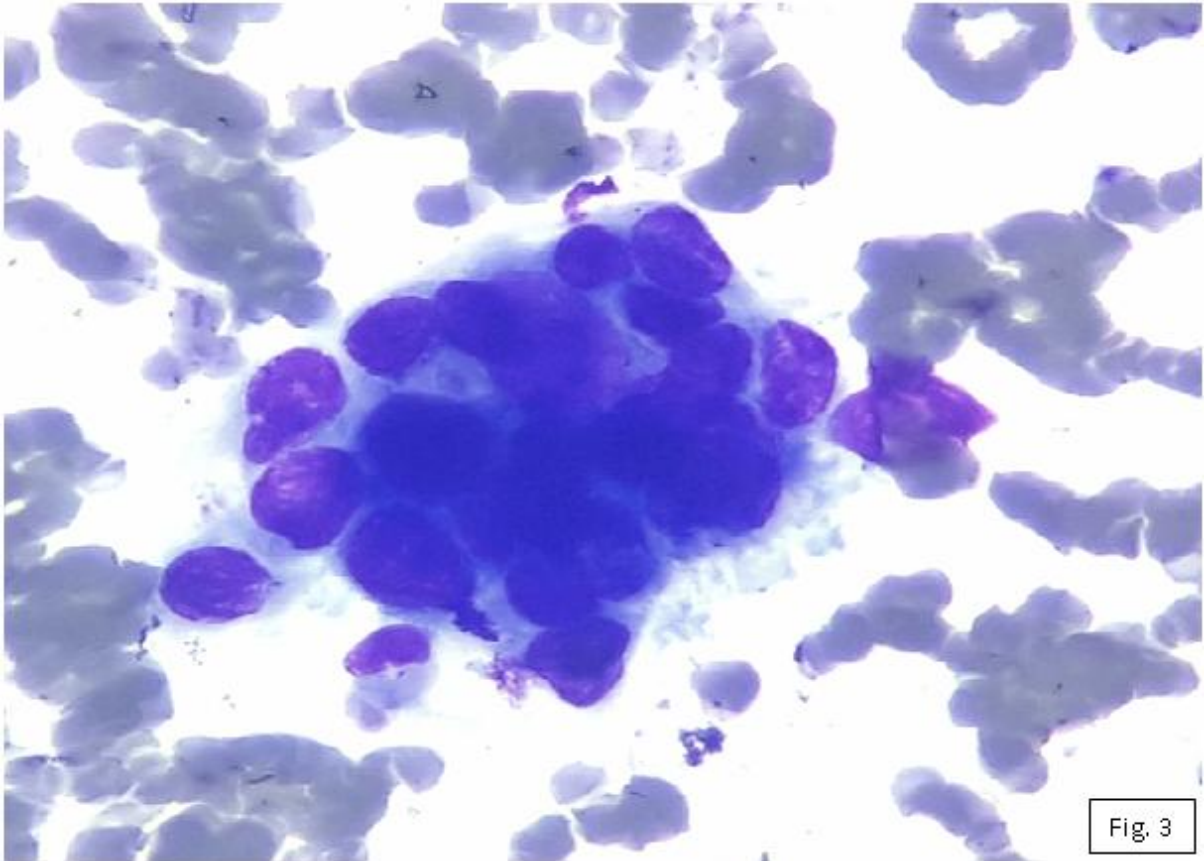


Fig. 3

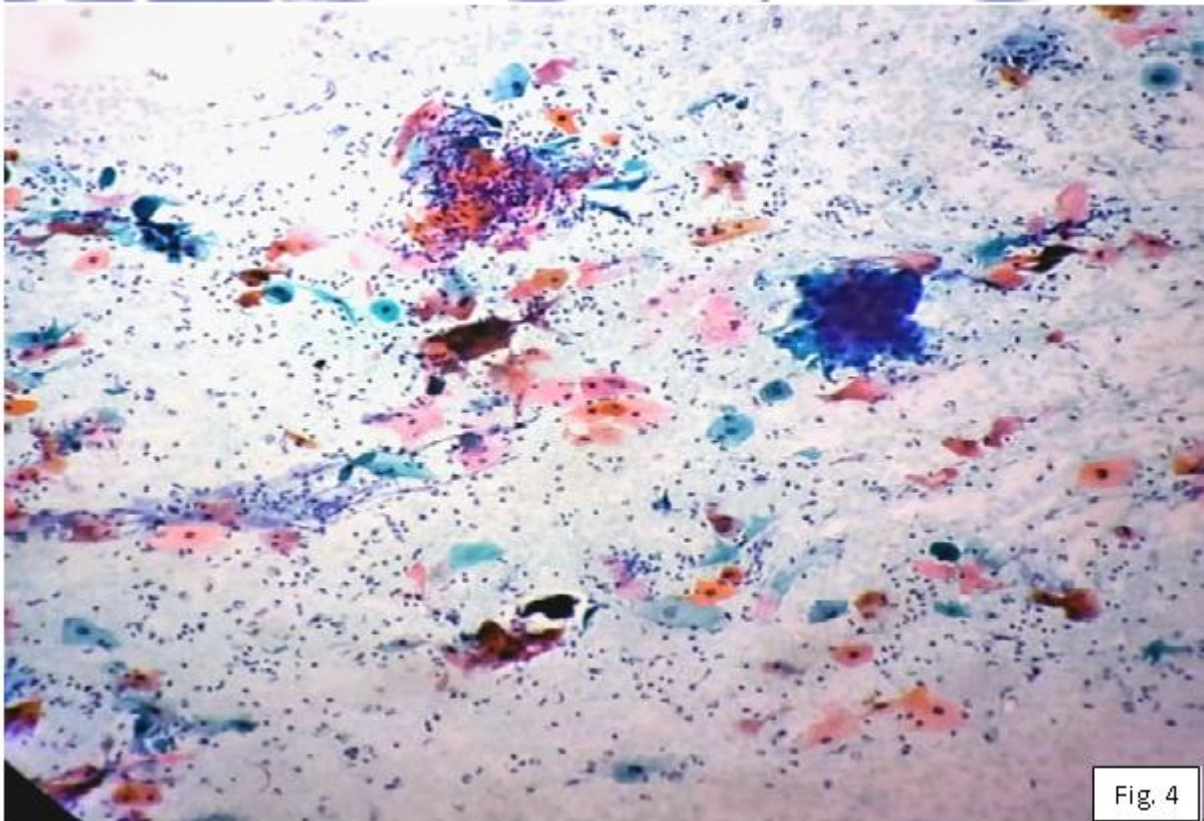


Fig. 4

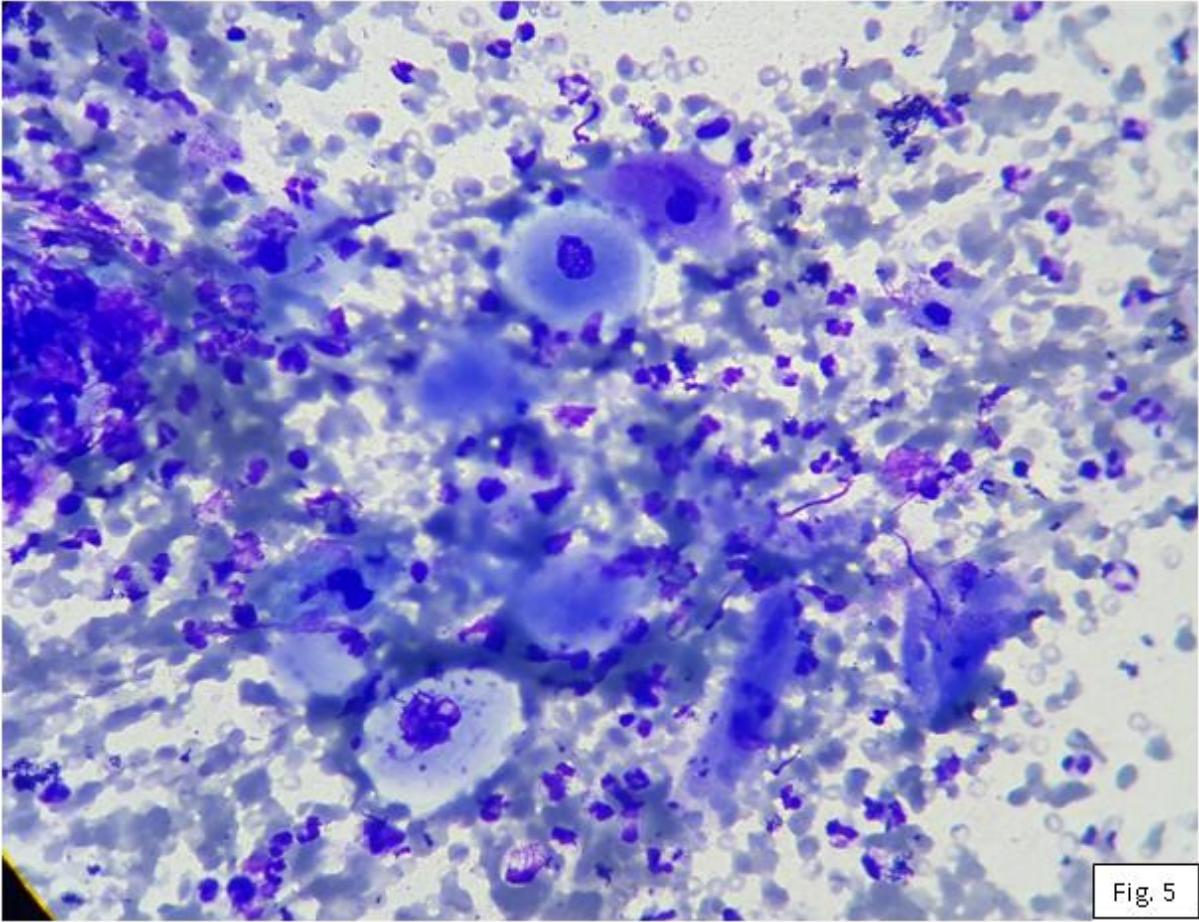


Fig 5

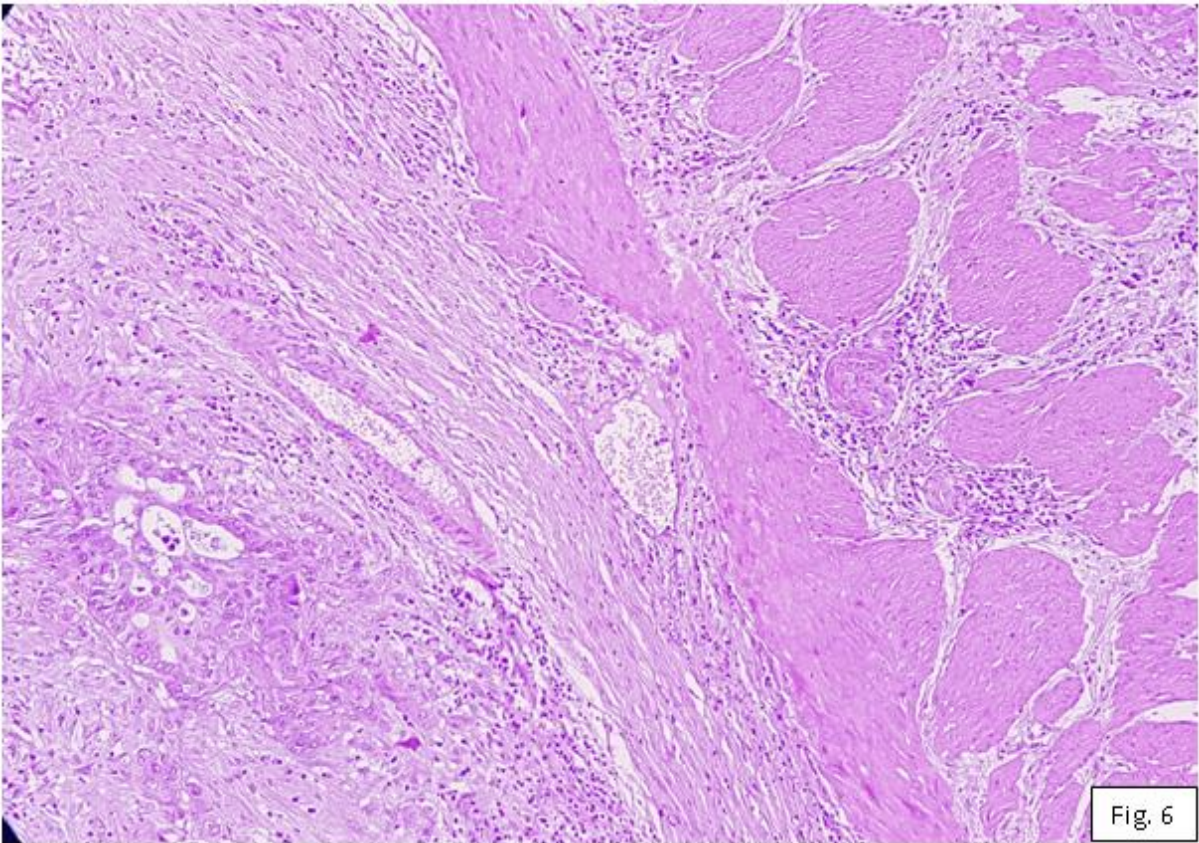
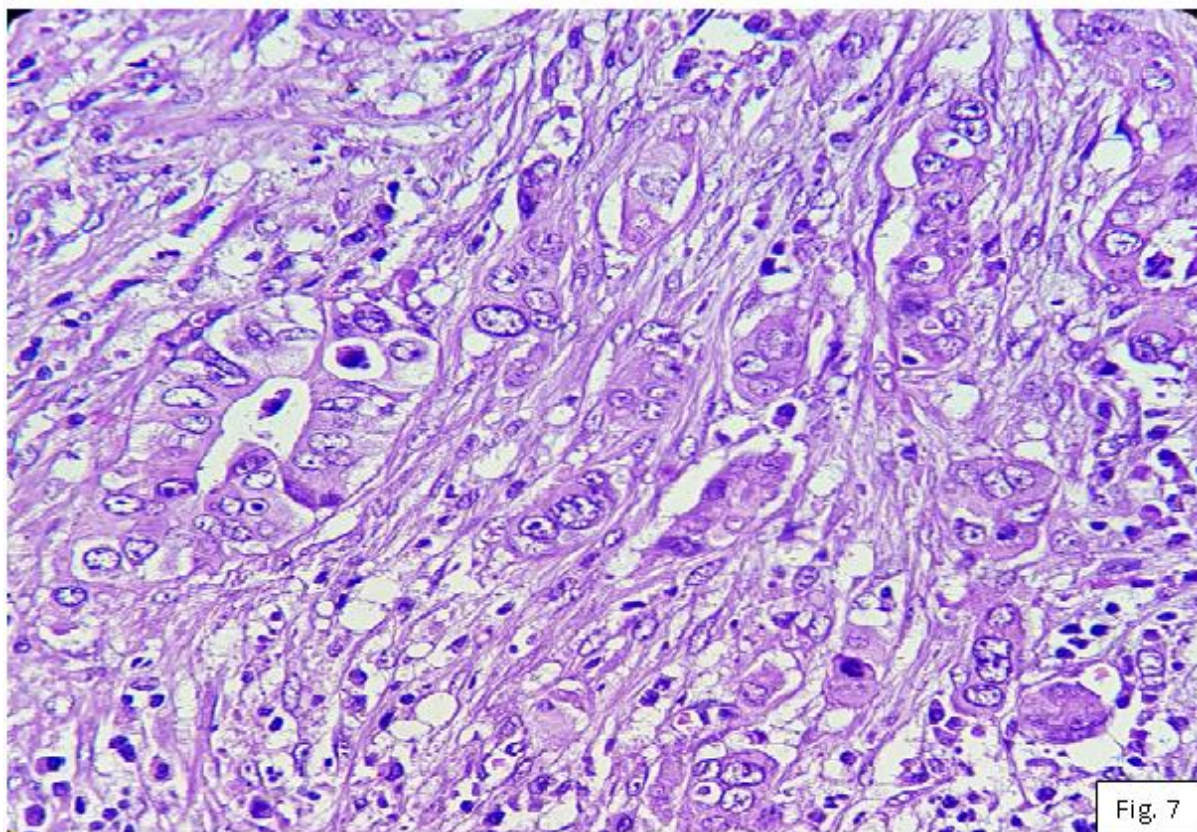


Fig 6



Legends:

Fig. 1 – Ultrasonogram of patient showing GB calculus with asymmetric isohypoechoic wall thickening.

Fig. 2– Photomicrograph showing adenocarcinoma : papillary structure showing cells with delicate cytoplasm, rounded nuclei with single prominent central nucleoli (PAP, 10X40).

Fig. 3 - Photomicrograph showing adenocarcinoma : cells showing acinar arrangement (MGG, 10X40).

Fig. 4 - Photomicrograph showing squamous carcinoma: cells predominantly scattered along with in clusters (PAP, 10X10).

Fig. 5 - Photomicrograph showing squamous cell carcinoma along with inflammatory cells and debris (MGG, 10X40)

Fig. 6 – Photomicrograph showing adenocarcinoma: tumor cells showing infiltration into perimuscular connective tissue (H&E, 10X10)

Fig. 7 – Photomicrograph showing adenocarcinoma: highly pleomorphic tumor cells (H&E, 10X40)

Shuchismita. “Ultrasound-Guided Fine Needle Aspiration Cytology of Gall Bladder Lesions: An Institutional Experience.” IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 18, no. 1, 2019, pp 32-39.