ORIGINAL ARTICLE

Compare The Efficacy and Complications of 16 Gauge Vs 18 Gauge Core Biopsy Needle in Ultrasound Guided Percutaneous Liver Biopsies

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ABSTRACT

Objective: To compare the efficacy and complications of 16 Gauge and 18 Gauge core biopsy needle in ultrasound guided percutaneous liver biopsies.
Materials & Methods: We prospectively analyzed 426 patients of either gander who underwent USG-guided liver biopsies for histopathological evaluation of space occupying lesion of liver or diffuse liver disease in our institute from January 2016 to December 2016.
Statistical analysis was carried out using SPSS version 21 for quantitative variables such patient's age, mean and standard deviation was calculated while frequency and percentages were calculated for qualitative variables such as gender, complications and status of repeat biopsy. Comparison of age and gender was done with respect to diagnosis of the patients. One-way ANOVA test was applied to see the association of age and diagnosis whereas chi-square test was applied for gender and diagnosis of the patients. P-value <0.05 was taken as significant.
Results: A total of 426 patients were included in the study, out of which 244 (57.3%) were males while 182 (42.7%) were females. 202 (47.41%) patients underwent liver biopsy by 16 gauge core biopsy needle while 224 (52.58%) patients had biopsies using 18 gauge needle.
Overall, mild pain was found in 86 (20.2%) patients, severe pain in 36 (8.5%) patients, vasovagal in 13 (3.1%) patients, local hematoma in 12 (2.8%), severe hemorrhage in 3 (0.7%), pneumothorax in 2 (0.5%) patients while 20 (4.7%) samples were inadequate. Number of inadequate specimen was significantly higher in patients who underwent biopsy by 18 gauge core biopsy needle (p-value 0.001). Severe pain was significantly higher in patients who underwent biopsy by 16 gauge needle (p-value 0.016).
Conclusion: Ultrasound guided percutaneous liver biopsy using either 16 or 18 gauge core biopsy needle is safe and effective method to characterize liver pathology with very low rate of complications. However 16 gauge needle should be preferred as the inadequacy of specimen in our study was higher for 18 gauge needle.

Keywords: Biopsy, Ultrasonography, core biopsy needle.

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INTRODUCTION

Percutaneous liver biopsy is the method of choice that has been used for many years. Paul Erlich was the first who performed it in 1883[1].

Currently main indications for percutaneous liver biopsy are space occupying lesions of the liver, autoimmune hepatitis, chronic viral hepatitis, alcoholic liver disease, hemochromatosis, Wilson's disease, primary sclerosing cholangitis, primary biliary cirrhosis, and evaluation of hepatic function disorders of undefined etiology.

Common complications of percutaneous liver biopsy can be classified as major and minor. Mild pain at the biopsy site, severe pain which require analgesia, mild hypotension (vasovagal) and local hematoma are included in minor complications. Major complications include excessive bleeding, heamobilia, bile peritonitis, sepsis, bacteraemia, heamothorax, pneumothorax and death[1].

Nowadays there are various options of liver biopsy like percutaneous, transjugular and laparoscopic biopsy

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methods, however Ultrasonography guided percutaneous methods is preferred because of high diagnostic value and lower rate of complications[1,2].

Ultrasound guided percutaneous liver biopsy is the gold standard for characterization of liver lesions, determination of diffuse liver disease and liver fibrosis. Liver biopsy is considered an easy procedure however, some complications may occur in up to 5% of the patients, such as pain which may require hospital admissions, bleeding requiring transfusions or surgery, pneumothorax, inadequate sampling or obtaining other tissues which require repeat biopsy. Attempts should be made for a safe procedure which would decrease the complication rates. Liver biopsies when performed under ultrasound guidance, show significantly decrease rates of complications[3-6].

In this study we evaluate the complications and quality of biopsy specimens obtained by liver biopsy using either 16 or 18 guage core biopsy needle in patients with target liver lesion or diffuse liver disease for histopathological diagnosis. My aim to conduct this study was to publish some data regarding the needle guage size as there is no authentic local or international published data till date. By publishing this data of 426 patients, the people will have some reliable source to look into, before choosing right needle size.

MATERIALS & METHODS

Data Collection procedure: This is a prospective study conducted from January 2016 to December 2016. A total of 426 patients were included in the study, out of which 244 (57.3%) were males while 182 (42.7%) were females. All patients of either gender came with histopathological evaluation of space occupying lesion of liver or diffuse liver disease.

Bleeding parameters were checked before the procedure which included prothrombin time (PT), partial thromboplastin time (PTT), and platelet count. A platelet count above 80000/ìl and INR (international normalized ratio) less than 1.2 were considered acceptable for the procedure. All patients signed informed consent forms after details of the procedure and possible complications were explained.

The procedure was performed in the supine position. Lesion to be biopsied was localized using abdominal US. The color Doppler imaging was also performed to see adjacent large vessels. The needle entry site was marked on the patient's skin by marker. The surrounding area was scrubbed with povidone iodine solution. 3-5 mls of local anesthetic (2% lidocaine hydrochloride) was given subcutaneously with a 23-gauge needle in the abdominal wall. After giving incision, biopsy needle was inserted under ultrasound guidance. Biopsy was performed using semi automatic biopsy guns having 18- or 16-gauge needles. The length of the obtained specimen was adjusted to 10 or 20 mm depending on the size of lesion while in patient with diffuse liver disease we usually took 20 mm sample. Usually single core of tissue was taken from 16 gauge while two cores of tissue were taken from 18 gauge biopsy needle. The biopsy specimen was preserved in formalin and sent for histopathological examination. After the procedure the patients were monitored in the recovery room for 2-3 hours for likely complications.

Statistical analysis was carried out using Statistical package for social sciences (SPSS) version 21. For quantitative variables such patient's age, mean and standard deviation was calculated while frequency and percentages were calculated for qualitative variables such as gender, complications and status of repeat biopsy. Comparison of age and gender was done with respect to diagnosis of the patients. One-way ANOVA test was applied to see the association of age and diagnosis whereas chi-square test was applied for gender and diagnosis of the patients. P-value <0.05 was taken as significant.

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008. Informed consent was obtained from all patients for being included in the study.

RESULTS

426 patients were included in the study, out of which 244 (57.3%) were males while 182 (42.7%) were females. Mean age of the patients was 54.62 ±13.25years. 202 (47.41%) patients underwent liver biopsy by 16 gauge core biopsy needle while 224 (52.58%) patients had biopsies using 18 gauge needle.

Overall, mild pain was found in 86 (20.2%) patients, severe pain in 36 (8.5%) patients, vasovagal in 13 (3.1%) patients, local hematoma in 12 (2.8%), severe hemorrhage in 3 (0.7%), pneumothorax in 2 (0.5%) patients while 20 (4.7%) samples were inadequate (table 1).Comparison of complications in both groups (table 2) showed that except inadequate specimen and severe pain, insignificant association of complications

Table 1: General characteristics of the patients (n=426)

	n	%
Age, in years	54.62±13.25[t]	
Gender		
Male	244	57.30
Female	182	42.70
Complications		
MildPain	86	20.20
Severe Pain	36	8.50
Local Hematoma	12	2.80
Servere Hemorrhage	3	0.70
Inadquate Sample	20	4.70
Vasovagal	13	3.10
Pneumothorax	2	0.50

[t]mean±Standard deviation

Table 2: Comparison of complications in both group

	Mild Pain		Severe Pain		Local Hematoma		Severe Hematoma		Inadaquate Sample		Vasovagal		Pneumothorax	
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Group	n%	n%	n%	n%	n%	n%	n%	n%	n%	n%	n%	n%	n%	n%
16 G	156 (45.9)	46 (53.5)	178 (45.6)	24 (66.7)	194 (46.9)	8 (66.7)	200 (47.3)	2 (66.7)	200 (45.9)	2 (10)	195 (47.2)	7 (53.8)	201 (47.4)	1 (50)
18 G	184 (54.1)	212 (46.5)	212 (54.4)	12 (33.3)	220 (53.1)	4 (33.3)	223 (52.7)	1 (33.3)	206 (50.7)	18 (90)	218 (52.8)	6 (46.2)	223 (52.6)	1(50)
p-value[t]														

[t]Chi-square test applied

was observed in both group. Number of inadequate specimen was significantly higher in patients who underwent biopsy by 18 gauge core needle as compared to the patients who underwent biopsy by 16 gauge needle (p-value 0.001). Severe pain was significantly higher in patients who underwent biopsy by 16 gauge needle as compared to 18 gauge needle (p-value 0.016).

Comparison of complications in both groups (16 G vs 18 G)

DISCUSSION

Although various non-invasive diagnostic methods are available for the assessment of liver pathology but liver biopsy is gold standard in characterizing the true underlying pathology. Liver biopsy has some drawbacks; as it is an invasive procedure having risk of various complications, sometimes it is difficult to evaluate the biopsy specimen due to inadequate sample. Performing biopsy of the liver using US guidance increases the rate of diagnosis by obtaining adequate sample, which increases the probability of definitive histopathological diagnosis[3-7].

Ultrasonography is the method of choice in image guided liver biopsies because it is real-time radiation free imaging. It gives well visualization of liver parenchyma, gallbladder and vascular structures, it is cheap, user friendly and easy to move.

Liver is supplied by large vascular network but the rate of complications of percutaneous liver biopsies are low when performed under US guidance. The common major complications of liver biopsy are hemorrhage, septic shock, biliary leakage, organ injuries, hemobilia, and arterio-venous fistula[3].

Glaser and Pausch[8] found the rate of serious complications was higher for laproscopy than percutaneous liver biopsy performed without image guidance. Piccinino et al[9]. found this rate to be 2.2%. Lindor et al. 10 compared the duration of stay in hospital and found it to be 2.2% in the procedures performed without ultrasound assisstance and 0.5% in ultrasound assissted procedures.

In our study, the overall complication rate was low, most common being mild pain which was relieved without any pain killers. Mortality was 0% in our study. In the literature, the reported pain rate after biopsy was between 5% and 50%. In our study approximately 8%
patients suffered pain which required analgesia, which is quite low as compared to those reported in the literature.

Govender et al[11]. performed percutaneous liver biopsy in 597 patients, and observed complications in 1.7% which include, pneumothorax, pseudoaneurysm and symptomatic hematoma. Piccinino et al. did study on 68276 biopsies over 10 years and found shock, pneumothorax, hemoperitoneum and biliary peritonitis as the major complications. In our study, only 5 (1.1 %) patients out of 424 patients had major complications which included severe haemorrhage in 3 (0.7 %) patients that required hospital admission and pneumothorax in 2 (0.47 %) patients, out of them one

patient required chest tube placement while other had small pneumothorax that resolved spontaneously. Other serious complications were not observed in our study. It is recommended in certain studies that minimum specimen size should be 15 mm in length; however, 40mm length of the sample size is suggested in other studies. In our study, the average specimen length was 16 mm. We usually took two specimens from 18 gauge and single specimen from 16 gauge core biopsy needle. Inadequate specimen was the second common complications of our study observed in 20 cases (4.7%). Out of these 18 were biopsied with 18 gauge core needle while two with 16 gauge needle.

A study showed that chances of complications were lower for physicians who performed more than 50 biopsies per year[12]. Our study has limitation that biopsies were carried out by different interventional radiologists of our department having variable work experience. However, there are other studies which show that clinician's experience is not a major factor to affect the complication rate[13]. As there is lack of any protocol about when to use 16 or 18 guage needle therefore different interventional radiologists in different setup choose different needle size by their own choice without following any guidelines.

This is a known fact that using small bore needle will cause less pain compared to large bore needle. However my study clearly justified that although 16 gauge needle causes severe pain in more patients as compared to patients with 18 gauge needle but this pain could be relieved by using simple analgesics, using 18 gauge needle on the other hand although causes severe pain in lesser number of patients but the frequency of rebiopsy increases secondary to inadequate sample. This repeated biopsy burdens the patient on pocket and also causes him more mental trauma of undergoing rebiopsy.

CONCLUSION

Ultrasound assissted percutaneous liver biopsy using either 16 or 18 gauge core needle is safe and effective method to characterize liver pathology with very low rate of complications. However 16 gauge needle should be preferred as the inadequacy of specimen in our study was higher for 18 gauge needle.

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