the Acquired changes in morphology of liver are represented by the following:

a) Linguiform lobes
b) Costal organ with small left lobe
c) Deep renal impressions

d) Accessory fissure, Normal fissure and lobes, Absence of fissure for ligamentum teres, Spiegel's lobe/Couinaud's segment-enlargement, Sulci on anterior surface. Out of 64 livers specimens; Liver with normal architecture were 30 (46.87%) and liver with enlargement, Sulci on anterior surface. Out of 64 livers specimens; normal liver were found. Hence, we have undertaken this study to note the variations on the surface of the liver.

Studies were on segmental anatomy of the liver has been researched but studies regarding the surface variations of the liver were less in found. Hence, we have undertaken this study to note the variations on the surface of the liver.

The study was undertaken to investigate the anatomical variations in the cadaveric liver in the Department of Anatomy, D.Y. Patil Medical College at D.Y. Patil Education Society, Deemed to be University, Kolhapur.

MATERIALS AND METHODS
64 formalin fixed liver were used for this study. All these livers belonged to adults of unknown age and gender. These livers were taken during the routine dissection from embalmed cadavers during last 3 years (from 2014-2017 batch) apparently normal liver were considered for the study. Liver specimens were observed for any morphological variations. Photographs of all variations were noted.

OBSERVATION AND RESULTS
The 64 liver specimens available at D.Y. Patil Medical College, Kolhapur.

The following morphological features were recorded. Accessory lobe, Hypoplastic left lobe, Absence of quadrate lobe, Lingular process of left lobe, Accessory fissure, Normal fissure and lobes, Absence of fissure for ligamentum teres, Spiegel's lobe/Couinaud's segment-enlargement, Sulci on anterior surface. Out of 64 livers specimens; Liver with normal architecture were 30 (46.87%) and liver with variations were 34 (53.12%).

Table no.1 Variation of liver

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Type of variation</th>
<th>No. of liver specimens</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Accessory lobe</td>
<td>4</td>
<td>6.2%</td>
</tr>
<tr>
<td>2</td>
<td>Hypoplastic left lobe</td>
<td>4</td>
<td>6.2%</td>
</tr>
<tr>
<td>3</td>
<td>Absence of quadrate lobe</td>
<td>3</td>
<td>4.6%</td>
</tr>
<tr>
<td>4</td>
<td>Lingular process of left lobe</td>
<td>4</td>
<td>6.2%</td>
</tr>
<tr>
<td>5</td>
<td>Accessory fissure</td>
<td>9</td>
<td>14.0%</td>
</tr>
<tr>
<td>6</td>
<td>Normal fissure and lobes</td>
<td>30</td>
<td>46.8%</td>
</tr>
<tr>
<td>7</td>
<td>Absence of fissure for ligamentum teres</td>
<td>2</td>
<td>3.1%</td>
</tr>
<tr>
<td>8</td>
<td>Spiegel's lobe/Couinaud's segment-enlargement of papillary process</td>
<td>2</td>
<td>3.1%</td>
</tr>
<tr>
<td>9</td>
<td>Sulci on anterior surface</td>
<td>6</td>
<td>9.3%</td>
</tr>
</tbody>
</table>
Out of 34 livers with variations 5 liver (7.8%) showed sulci on the anterior superior surface of right and left lobes. The sulci were superficial in 1 liver (1.5%) and deep in 4 (6.2%). Out of 34 livers with variation, caudate lobe in 3 livers (4.6%) showed morphological variations; such as enlargement of papillary process in 1 liver (1.5%), variation in shape on 1 liver (1.5%) and accessory caudate lobe found in 1 specimen (1.5%).

Out of 34 livers with variations, quadrate lobe in 6 liver showed morphological variations such as pons hepatitis segment connecting quadrate lobe to left lobe over the fissure for ligament teres hepatitis was noticed in 1 liver (1.5%) and presence of horizontal fissure in 2 livers (3.1%) and absence of quadrate lobe in 3 specimens (4.6%).

Out of 34 livers with variations 14 liver (21.8%) showed morphological variations of left lobe with right lobe normal. Hypertrophy of left lobe was noticed in 1 liver (1.5%); while fissure on left lobe were seen in 3 livers (4.6%) and Lingual process was noticed in 6 livers (9.3%). Hypo plastic was showed in 4 specimens (6.2%) and agenesis of left lobe was absent.

34 livers with variations 4 liver (6.8%) showed accessory lobes. In these 2 livers (3.1%) showed Reidel's lobe.

**Figure 1: absence of quadrate lobes**

**DISCUSSION**

The liver is known to show variations in the form of lobes or fissure anomalies. The congenital anomalies of liver in humans are very rare in spite of its complex development and are rare as compared to other organs of the body. Anomalies may be high in society, but we do not notice them as they are asymptomatic. In our study out of 64 livers specimens variations were present in 34 specimens (53.12%). Out of 34 livers with variations 5 specimens showed sulci on the anterosuperior surface (7.8%) of both the lobes. The sulci were superficial in 1 liver (1.5%) and deep in 4 (6.2%).

According to Schafer and Symington (1896) and De Burlet (1910) the sulci result from uneven growth of the hepatic parenchyma caused by variable resistance offered by different bundles of diaphragm muscle. Fissure was present in 2 specimens (4%) and in 2 specimens (3.1%) horizontal fissures were present on the quadrate lobe.

Any collection of fluid in the deep sulci may be mistaken for a liver cyst, intrahepatic hematoma or liver abscess. Implantation of peritoneally disseminated tumor cells into these spaces may mimic intrahepatic focal lesions.

Out of 34 livers with variations morphological variation in the shape of caudate lobe were observed in 3 specimens (4.6%) and one liver showed the enlargement of papillary process (Spiegel's lobe or Couinand’s segment) in our study. Auh et al. an enlarged papillary process may mimic a pancreatic body mass if it extends very far. Out of 34 livers with variation, in our study 6 specimens (9.3%) presented morphological variations in the Quadrate lobe such as pons hepatitis segment connecting quadrate lobe over the fissure for ligamentum teres hepatitis in one specimen (1.5%) and horizontal fissure in 2 specimens (3.1%) and there was absence of quadrate lobe in 3 cases (4.6%).

In cases of pons hepatitis bridging the fissure for ligamentum teres normal visualization of the fissure would not be possible and dimensions of right and left lobe may be mistaken.

Out of 34 livers with variations 14 (21.8%) showed morphological variations of left lobe with normal right lobe. In our study hypertrophy was seen in one specimen (1.5%), such enlargement was also noticed by Pratibha Baruah and Hammond Ll. In our study 6 (9.3%) specimens showed tongue like elongation, such lingular process were observed by Hammond LJ, Chiba S, Dunlop DJ, Sultana S. In this study Hypoplastic livers showed in 4 (6.2%) and fissure on left lobe were found in 3 (4.6%) and agenesis of left lobe were absent.

**CONCLUSION**

Morphological variations in liver could be developmental in origin or due to pressure exerted by diaphragm, peritoneal relations and other organs in relation with liver so developed during life time of a person. The study was carried out to add on knowledge of the variations for the anatomist, surgeons and imaging specialist; which will prevent misdiagnosis of cystic lesions or any macroscopic pathological lesions of the liver.

**References:**