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Morphological study of cadaveric spleen in Jharkhand state population

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Abstract
Aim: To study the morphological variations of spleen in formalin fixed cadavers.
Material and Method: 28 cadaveric spleen were investigated. The spleen was noted for morphological variations in terms of size, shape, notches and lobes present in superior, intermediate and inferior borders.
Result: Out of 28 spleen, 18 spleens were found to be normal and variations were observed in 10 spleen. In observation 3 spleen(10.7%)were found multiple lobes and multinotched, notches were present on superior border, 2 spleen(7.1%) having deep notches on intermediate border,2 spleen(7.1%) were found presence of notches in inferior border and 2 spleen(7.1%) was observed wedge shaped (shape of liver) and 1 spleen(3.6%) was small in size.

Keywords: morphological, spleen, population, liver

Introduction
Spleen is the largest hemo-lymphatic organ situated in the left hypochondrium of abdominal cavity. Oval in shape having two poles- anterior and posterior; Three borders- superior, inferior and intermediate. Superior border of spleen is characteristically notched by the anterior end. The spleen of adult person usually follow rule of odd numbers i:s 1 intch thick, 3 inches widths, 5 inches long, 7 ounces in weight and related to 9-11 ribs. The spleen develops in the cephalic part of dorsal mesogastrium from its left layer, during sixth week of intrauterine life. Normally spleen is not palpable until it becomes its double in size. Congenital anomalies are rare in case of spleen. Most common anomaly is presence of an accessory spleen (about 10%-30%) (Gayer *et al*. 2006) [7]. Other anomalies are absence of spleen, duplication, polysplenia etc. Present study is to find out morphological variations of spleen occurring in Jharkhand state population.

Materials and Methods
This study was focused in the morphological variations in 28 formaldehyde fixed cadaveric spleen (23 males and 5 females) obtained from routine dissection classes of undergraduate and post-graduate medical students in Mahatma Gandhi Memorial Medical College Jamshedpur, East-Singbhum district of Jharkhand state. Spleen were obtained during abdominal dissection. Dissection started from incision given to the skin, muscles of the anterior abdominal wall were reflected and dissected to open the peritoneal cavity. After obtaining specimen, spleen was morphologically studied under variation in length, width, thickness, presence of notches on its superior, inferior and intermediate borders as well as anomalies. Measurements were taken by measuring Tape and calipers, specimens were photographed and finding were appropriately documented.

Results
Out of 28 spleen investigated 18 spleen (64.3%) were considered normal.
In the 28 spleen variations were observed in 10 spleen (35.7%),

- 3 spleen (10.7%) were found multiple lobes and notches were present on superior border of spleen
- 2 slpeen (7.1%) having deep noches on intermediate border.
- 2 spleen (7.1%) were observed presence of notches on the inferior border.
- 1 spleen (3.6%) was found small in size (2.5 inches in length).
- 2 spleen (7.1%) was found wedge shaped (Liver shaped)

Table 1: Numbers and percentile variations of spleen in Jharkhand population out of 30 cadavers.

S. No	No. Of spleen	Percentile	Variations
1	3	10.7%	Multiple lobes and noches present in superior border
2	2	7.1%	Deep notches present on intermediate border
3	2	7.1%	Notches present on inferior border
4	1	3.6%	Small size
5	2	7.1%	Wedge shaped(liver shaped)

Fig 1: Superior border of spleen showing multiple notches

Fig 2: Inferior border of spleen showing notches.

Fig 3: Intermediate border of spleen showing Deep notch.

Fig 4: Wedge shaped (liver shaped) Spleen.

Discussion

The spleen is a mysterious organ whose structural and functional relationship have started being realized only now. Spleen develops in the cephalic part of dorsal mesogastrium from its left layer during sixth week of intrauterine life studied by Sadler 2000 [2]; Standring 2005 [1]. During the early stage of development spleen is represented by small splenic buds later on they fuse to form a single spleen. Sometimes some buds independently developed and form an accessory spleen. The fusion is incomplete and often it occurs on the superior border so embryologically notchs are present on superior border. Until recently spleen was thought to be less important organ but as the medical science progresses it is known to be important in circulatory and immune system. As reported by Michels and as mentioned in Grays anatomy and his present study there are so many variations were found in the morphology of spleen. The value for the length, breadth and weight of the spleen varies due to differences in the genetic factors, body constitutions, geographical conditions, feeding habits etc. Ivan Varga *et al.* 2009 studied the congenital anomalies of spleen like lobular spleen asplenia, polysplenia and splenogonadal fusion. Hakk Maummer Karakas *et al.* 2005 [11] studied splenic abnormalties on CT Scan and MRI. They found the congenital variations of spleen like asplenia and polyspenia syndrome. Both anomalies were associated with multiple system and organ anomalies including liver and heart. Weiand and Mangold 2003 reported accessory spleens are present in about 10-15% of indivisuals out of which 1%-2% may be located in the tail of pancreas. Presence of retroperitoneal accessory spleen may mimic tumors of retroperitoneal space with clinical symptom of epigastric pain *nausea and vomiting (Souparis et al. 2002) [4]*. *Ectopic spleen* (Gigot J 1998) should not be confused with metastasis, adinopathy or another solid tumor by the radiologists to avoid diagnosing incorrectly. By Satheesha Nayak B 2011 [13] in current study only 50% of the spleens presented with notched superior border. By Skandalakis *et al.* 1993 (78.6%), Soyluolu *et al.* 1996 [15] (70%), Ungor *et al.* 2007 [9] (95%) previously studied splenic notches on superior margin respectively. In our study we observed only in 64.3% of cases, superior border having splenic notches. According to our observation standerd textbook should incorporate the fact that presence of notches is confined not only to superior border but thay can also be present in the inferior border. During splenctomy presence of notches in the inferior border may be important for surgeons and radiologists.

Conclusion

Studies related to morphological analysis of spleen seem to be under reported and need to be carried out actively at various medical institutions for obtaining a more solid information. The implication of such projects is that it could not only inhance the fundamental knowledge but also furnishes much insights on spleens clinical utility. This study focus the anatomical variations, anomalies of spleen existing in Jharkhand population which forms a guidline for safe and effective surgeries.

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