

## CASE REPORT

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# Accessory Spleen in the Splenic Hilum: a Cadaveric Study with Clinical Significance

Shabnam Mohammadi<sup>1</sup>, Arya Hedjazi<sup>2</sup>, Maryam Sajjadian<sup>2</sup>, Naser Ghrobi<sup>2</sup>, Maliheh Dadgar Moghadam<sup>3</sup>, and Maryam Mohammadi<sup>4</sup>

<sup>1</sup>Department of Anatomy and Cell Biology, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran; Microanatomy Research Center, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

<sup>2</sup>Mashhad Legal Medicine Research Center, Legal Medicine Organization, Mashhad, Iran

<sup>3</sup>Department of Community Medicine, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran; Neurogenic Inflammation Research Center, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

<sup>4</sup>Department of Public Health, School of Health, Shahid Beheshti University of Medical Sciences, Tehran, Iran

**Corresponding author:** Dr. Arya Hedjazi, Mashhad Legal Medicine Research Center, Legal Medicine Organization, Mashhad, Iran. **E-mail:** Arya\_hedjazi@yahoo.com

## ABSTRACT

**Aim:** An accessory spleen is an additional tissue of the spleen that may be found near the spleen. It is a congenital anomaly of the spleen that its incidence has been reported 10-30% of the population. Hence, the objective of this study was evaluation the incidence of accessory spleen in Iranian cadavers. **Method:** Sixty hundred and ninety three spleens (541 males, 152 females) were excised from cadavers in the dissection hall of Mashhad Forensic Medicine Organization cadavers. Inclusion criteria were as follows: Fresh Iranian cadavers with no history of alcohol, poisoning or drug abuse, and no evidence of pathologic abnormality or injury to the spleen. The presence of accessory spleens, its dimension and weight investigated in cadavers. **Results:** During routine postmortem examination, five cases with an accessory spleen were found in the autopsy laboratory of Mashhad legal Medicine Organization between June 2014 and July 2015. Of the cases, 3 were male and 2 were female. The accessory spleens were observed at the splenic hilum. The length of the accessory spleens ranged from 2-3.5 cm, while the range of width was between 0.5 and 2.5 cm. The accessory spleens were confirmed by histological examination. **Conclusion:** An accessory spleen has clinical importance in some locations. When an accessory spleen is situated in another site, it may mimic some tumors such as pancreatic tumor and adrenal tumor. In addition, accessory spleen may cause hyperplasia after splenectomy and be responsible for a recurrence of the hematological disorders.

**Key words:** Accessory spleen, Variation, Cadaver, Spleen.

## 1. INTRODUCTION

The spleen is the greatest single mass of lymphatic tissue that lies between the left kidney, stomach and diaphragm (1). It has three surfaces: diaphragmatic, gastric and renal surface and the two borders: superior and inferior (1). The gastric surface meets the diaphragmatic surface on the superior border. The renal surface is marked by renal impression. This surface meets gastric and diaphragmatic surfaces respectively on the inferior border and a margin close to the splenic hilum

(2). The spleen removes old erythrocytes, white cells and platelets. It plays vital roles in regard to blood storage, formation of lymphocyte and defense against foreign particles (3). Accessory spleen is an ectopic splenic tissue develops result from the imperfect fusion of the splenic masses during embryonic life (4). It is found in 10-30 percent of the population (4, 5). Accessory spleens are found near the splenic hilum, in the gastrosplenic ligament, in the splenorenal ligament, in the mesentery, in the greater omentum, around the

pancreatic tail and along vascular pedicle of the spleen, but rarely in the gonads (6). Spleen primordium develops from the mesoderm of the dorsal mesogastrum in the fifth week of development. Accessory spleens rise from the dorsal mesogastrum as a result of failure fusion of the separate splenic nodules (4).

In the text book of Moore's Anatomy has been mentioned the incidence of the accessory spleen was in 10% of the population (7). In the USA, the incidence of accessory spleen was found at autopsy in 10-30% of American population (4). In a European study was found that the accessory spleen was present in 11% of patients undergoing abdominal CT-scan (8). The incidence of accessory spleen ranged between 4.5% and 24.28% in Asian population (9-11).

Accessory spleens may mistake for tumors. Hence, it is critical to correctly differentiate accessory spleens from tumors of the abdominal organs like adrenal tumor, pancreatic tumors or tumors of the retroperitoneal space (5, 12, 13). For example, when it is at pancreas region, it may mimic a pancreatic tumor. In addition, the present of the accessory spleen is important to avoid a recurrence of symptoms of the disease when spleen should be removed in hematological disorders (5, 12, 13). Hence, the objective of this study was evaluation the incidence of accessory spleen in Iranian cadavers.

## 2. METHOD

This study was carried out in the dissection hall of the Forensic Medicine Organization, Razavi Khorasan province, from June 2014 to July 2015. The protocol of the research was approved by the Ethics Research Committee of Mashhad Legal Medicine Organization. Sixty hundred and ninety three spleens (541 males, 152 females) were excised from cadavers in the dissection hall of Mashhad Forensic Medicine Organization cadavers.

Inclusion criteria were as follows: Fresh Iranian cadavers with no history of alcohol, poisoning or drug abuse, and no evidence of pathologic abnormality or injury to the spleen. The presence of accessory spleens investigated near the splenic hilum, in the gastrosplenic ligament, in the splenorenal ligament, in the mesentery, in the greater omentum, and around the pancreatic tail. The accessory spleens were confirmed by histological examination. The accessory spleen was measured using a Vernier caliper. Caliper calibration performed previously based on ISO guidelines. Besides, the spleen weight was measured with the help of an electronic weighing machine (Pand Azma 3100, Iran). Measurement for all cadavers was performed by a single anatomist. Photographs were taken using a Canon digital camera.

## 3. RESULTS

### Case No.1

A 20-year-old female, with no history of personal or family diseases that had been referred to autopsy laboratory of Forensic Medicine, Khorasan Razavi province,

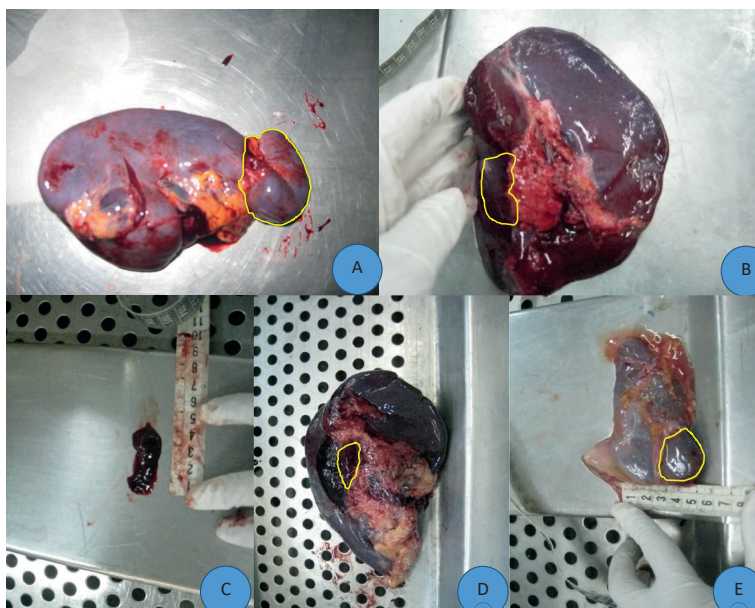


Figure 1. (A-E) are images of the spleens in case numbers 1 - 5, respectively. A yellow line is drawn around the accessory spleens. Figure E shows accessory spleen that is separated from the splenic hilum.

Iran, for medicolegal autopsy on August 3, 2014. The height, weight and BMI of cadaver were 162 m, 75 kg and 28.58 kg/m<sup>2</sup>, respectively.

An accessory spleen in the splenic hilum, measuring 3.5/2.5 cm, was observed (Figure 1).

### Case No.2

One accessory spleen was found in a female cadaver (age: 24 y, height: 165 m, weight: 69 kg, body mass index: 25.34 kg/m<sup>2</sup>) that was under examination to determine a cause of death. The accessory spleen was located in the hilum with 3 cm long and 1.5 cm wide (Figure 1).

### Case No.3

A 42-year-old male, with no history of poisoning, alcohol or drug abuse and no evidence of trauma or abnormality of spleen that had been referred to the Mashhad Legal Medicine on August 27, 2014. The height, body weight and BMI of cadaver were 163 m, 59 kg and 22.21 kg/m<sup>2</sup>, respectively. The accessory spleen was detected at the splenic hilum. Its length was 2.5 cm and its width was 1.5 cm (Figure 2).

### Case No.4

An accessory spleen was observed in a female cadaver (age: 34 y, height: 170 m, weight: 79 kg, BMI: 27.34 kg/m<sup>2</sup>) with no gross abnormality and injury of the spleen that needed autopsy. An accessory spleen was detected in the hilum of the spleen. The measurements using a Vernier caliper showed that it was 2 cm in length and 1 cm in width (Figure 1).

### Case No.5

A 61-year-old male, with no history of pathologic abnormality or injury to the spleen was subjected to an autopsy on February 21, 2015, by the Mashhad Legal Medicine, Iran. The values obtained for height, weight and BMI were 169 m, 68 kg and 23.81 kg/m<sup>2</sup>, respectively. The location of the accessory spleen also was found in the splenic hilum. The accessory spleen was measured 2.7 cm in length and 0.5 cm in width (Figure 1).

#### 4. DISCUSSION

In this first Iranian study investigated the incidence of accessory spleen in Iranian cadavers. The main finding of this study was the present of accessory spleen at the hilum of the spleen in five cadavers of Razavi Khorasan province, Mashhad, Iran.

In the text book of *Snell's Anatomy* has been reported the incidence of the accessory spleen 10 percent of the normal population and it may exist in the gastrosplenic ligament or in the lienorenal ligament (1).

The incidence of accessory spleen was 10-30% of American population with a predominant site of the splenic hilum (4). In another American study found that the accessory spleen was present in 15.6% of cases undergoing abdominal CT-scan (14). Their length ranged between 4 and 29 mm and the range of their width was from 4 to 25 mm (14). Similarly, the most common site of accessory spleen was near the hilum of the spleen and the maximum its width was 25 mm. However, our findings showed that the incidence of accessory spleen was lower than that in this study (0.7% vs. 15.6%, respectively). In addition, the maximum length of accessory spleen was more than that in American people. Romer and Wiesner studied CT-examination of 1735 patients in Switzerland, the accessory spleen was found in 11% of patients (8).

In a study by Rayhan, the incidence of accessory spleen has reported 24.28% in Bangladeshi people (9). In another study in India, 4.5% of the splenic samples exhibited an accessory spleen (10). In a study by Zhang and colleagues have reported that most there is one accessory spleen in which was consistent with our finding (11). Our results showed that the incidence of accessory spleen was less than that in Indian population. These differences might be due to genetic factors or race of cases.

The limitation of this study was that there was not available data about accessory spleen in our population for comparison in this paper. We suggest future studies with different race and age groups for better decision.

#### 5. CONCLUSION

An accessory spleen has clinical significance in that they may result in diagnostic errors for the oncologists or the persistence of the symptoms after splenectomy. Hence, this report may help surgeons, oncologists, radiologists, and the anatomists regarding the incidence of the accessory spleen.

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