

## TRIANGLE OF BROcq AND MOUCHET: AN ANATOMICAL STUDY IN HUMAN CADAVERIC HEART AND ITS CLINICAL SIGNIFICANCE

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### ABSTRACT

**Introduction:** Triangle of Brocq and Mouchet is an Arterio-venous triangle formed by Great Cardiac Vein (GCV), Anterior Interventricular Artery (AIA) and Circumflex Artery(CA) . The latter two are branches of Left Coronary Artery which lies on left side of anterior surface of the heart. The triangle is classified as closed, completely opened, inferiorly opened & superiorly opened on the pattern of disposition of these vessels. The triangle may also be absent.

**Materials and Methods:** We had studied in thirty cadaveric hearts of both sexes which were dissected in the Department of Anatomy, Bundelkhand Medical College, Sagar (M.P), India. Triangle of Brocq and Mouchet was identified and photographed.

**Results:** The triangle was found in 28 hearts( 93.33%) , in 02 hearts( 6.67%) it was not formed. In our study the most common was closed type as seen in 13 hearts( 46.43%) & least common was completely opened type as seen in 03 hearts ( 10.71%).

**Conclusion:** The aim of study was to provide information regarding anatomy of triangle in cadaveric hearts and knowledge of relation of these vessels forming its boundaries used in intravascular ultrasound of coronary arteries to help in identifying Pericardium , myocardium & vessels.

**KEY WORDS:** Triangle of Brocq and Mouchet, Great Cardiac Vein (GCV), Anterior Interventricular Artery (AIA), Circumflex Artery (CA), cadaveric hearts, intravascular ultrasound.

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### INTRODUCTION

Triangle of Brocq and Mouchet is an Arterio-Venous triangle which is bounded: Medially By Anterior Interventricular Artery (AIA), Supero-laterally- By Circumflex Artery (CA) and Infero laterally- By Great Cardiac Vein (GCV) . The first two are branches of left coronary artery.

Anterior Interventricular Artery descends in anterior interventricular groove while Circumflex Artery curved on left side in Atrio-Ventricular groove. The Great Cardiac Vein which is one of the tributary of coronary sinus begins at cardiac apex and runs in anterior interventricular groove along with Anterior Interventricular Artery towards left side of Atrio-Ventricular groove and

joins the coronary sinus at its origin . The triangle along with these structures is located between the conus arteriosus and the left auricle, on the left side of anterior surface of heart [1-2].

This vascular triangle may be classified into four types , according to arrangement of the structures forming its boundaries: (1) Closed type (2) Completely Opened type (3) Superiorly Opened type (4) Inferiorly Opened type . Rarely the triangle may be absent [3,4].

One of the clinical implications of the vessels disposition at the triangle have been emphasized relating to obstructive coronary artery disease [5,6]. In this case the GCV when presents posterior to arteries, compressed by rigid arteries in arteriosclerosis, which would impair venous return to left atrium. The aim of the study was to know the relationship of GCV and two branches of left coronary artery, helping in establishing the pattern of variation of this triangle. The study of disposition of structures composing the triangle and its boundaries are of relevance to surgical procedures at heart.

### MATERIALS AND METHODS

The present study was carried out in the Department of Anatomy at Bundelkhand Medical College & Hospital, Sagar (M.P.), India. Thirty human cadaveric hearts of both sexes fixed in 10% formalin were dissected to observe the triangle. The study was approved from our institutional review board. We specifically evaluated GCV, AIA and CA. The various types of triangle depending on the distribution vessels forming it were observed and photographed. The data obtained was analyzed and compared with that of previous studies.

### RESULTS

Out of 30 hearts, the triangle was present in 28 hearts (93.33%) & absent in 02 hearts (6.67%). Regarding classification of triangle, the pattern of distribution in our study is as follows:

- (1) Closed : 13 specimens( 46.43%)
- (2) Completely Opened : 03 specimens (10.71%)
- (3) Inferiorly Opened : 08 specimens (28.57%)
- (4) Superiorly Opened : 04 specimens (14.28%)

### DISCUSSION

The triangle of Brocq and Mouchet is subdivided following the recommendations of previous studies into:

(1) Closed: When the GCV crosses both CA & AIA.

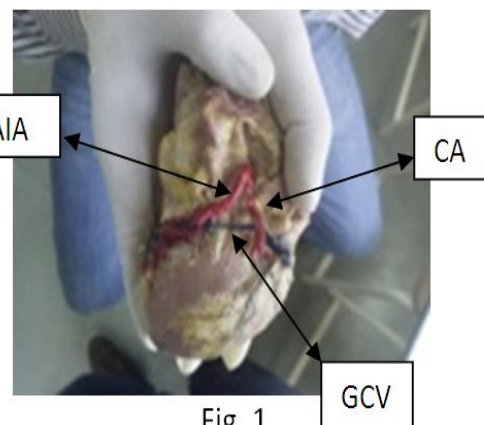


Fig. 1

(2) Completely Opened: When GCV does not cross any other vessel & is located inferiorly to CA.

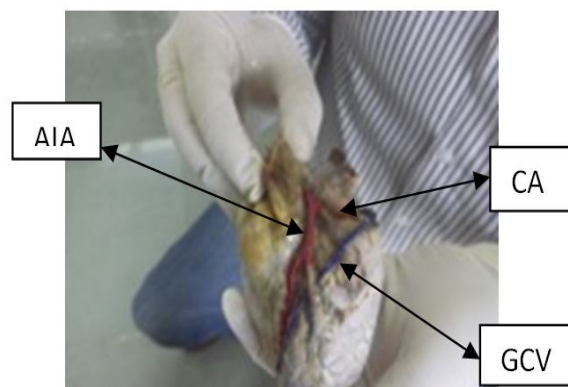


Fig. 2

(3) Inferiorly Opened: When GCV does not cross AIA and located left to it , the vein crosses the CA , passing anteriorly or posteriorly to this vessel.

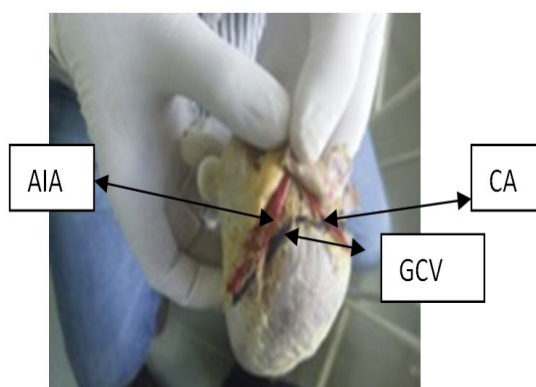


Fig.3

4). Superiorly opened: When GCV crosses the AIA anteriorly or posteriorly during its course but does not cross CA and lies inferiorly to it.

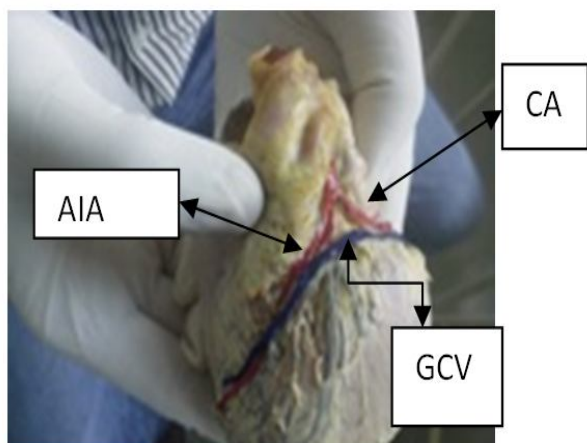


Fig-4

5) Absent of triangle: When GCV is on the left of AIA and ascends to the bifurcation of CA and then turns left, where it accompanies the CA.

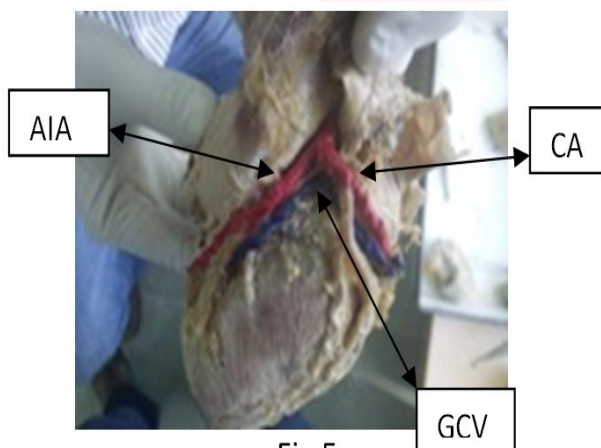


Fig.5

**AIA-** Anterior interventricular artery, **CA-** Circumflex artery, **GCV-** Great Cardiac Vein

According to Sousa-Rodrigues' [4] study, the triangle is present in 88% of cases, which is lower than our results. Pejovich and Bogdenovich (1992) [3] reported an occurrence of 98% at his study, which is higher than other authors. According to Andrane study [7], the triangle was found in 86.9% and in remaining 11.1% it was absent. According to Bharati D. study [8] the triangle was present 86.7% and absent in 13.3%.

In our study, out of 13 closed type, in 09 types (69.23%) GCV lies anterior to AIA and in 04 types (30.77%) it lies posterior to AIA. While performing an intravascular ultrasound of coronary arteries to help in identifying

pericardium, myocardium and vessels, this triangle is commonly used [6]. The relations of the GCV to CA & AIA, regarding to the "type of crossing" between vessels had been extensively studied, the vein may cross those vessels anteriorly, posteriorly or even never cross neither [9].

**Table 1:** Comparing the frequency of types of Brocq & Mouchet in various studies.

Classification of the Triangle	Our Study %	Bharti (2013) [8] %	Andrade, Ribiero, Babinski (2010) [7] %	Sousa-Rodrigues, Alcantra, Silva et al. (2004) [4] %	Ortale, Gabriel, Lost et al (2001) [5] %
Closed	46.43	50	22	35	18
Completely Opened	10.71	6.6	22	9	15
Inferiorly Opened	28.57	20	44	52	64
Superiorly Opened	14.28	10	11	4	3

## CONCLUSION

Our study is concerned with anatomical structure and variation of boundaries of the triangle of Brocq and Mouchet and its application for cardiac interventional surgeries. Further anatomical studies are required to enhance the knowledge and skills for development of advanced cardiac interventional procedures.

**Conflicts of Interests: None**

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