A STUDY OF ARTERIAL SUPPLY OF CAECUM IN HUMANS.

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ABSTRACT: The surgical procedures on the caecum demand a precise knowledge of vascular anatomy of ileocolic region. The aim of this study is to study the arterial supply of the caecum, findings of which may reveal more anatomical facts about the arteries of caecum and their variations. Total 52 specimens of caecum and appendix with their arteries intact were collected, cleaned and dissected. The ileocolic artery and its branches to the caecum, and ileum were traced carefully and observations were recorded. The ileocolic artery arises independently from superior mesenteric artery in 96.88% of cases and ends by dividing into superior and inferior division in 93.76% of cases. The anterior and posterior caecal arteries arise by a common trunk in 56.25%. The ileocolic artery arises from the superior mesenteric artery independently in 96.88% and terminates into superior and inferior division in 93.76% of cases. Common caecal artery seen in 56.25% of cases, arises from inferior division (43.75%), superior division (9.38%) and ileocolic artery (3.12%).Anterior caecal artery arises from superior division (12.5%), inferior division (15.63%), ileocolic artery (3.12%), ileal branch (6.25%) and arterial arcade (6.25%).The posterior caecal artery arises from superior division (18.76%), inferior division (9.38%), ileal branch (3.12%), ileocolic artery (3.12%), arterial arcade (6.25%) and from ascending colic branch of inferior division (3.12%). 21.87% of cases showed additional anterior and posterior caecal arteries.

KEYWORDS: Caecum, ileocolic artery, anterior caecal artery, posterior caecal artery.

INTRODUCTION: Holstead, a pioneer American surgeon has said that the best way to avoid injury to the blood vessel is to know how, when and where to ligate them. The responsibility of studying the arterial variations lies with the anatomists, the knowledge of which helps the surgeons.

Caecum has got great importance because it is prone for many pathological conditions. So surgical procedures on caecum demand a precise knowledge of vascular anatomy of ileocolic region. Literature pertaining to the vascular anatomy of caecum is vast in western population. There is need for the study on Indian population. In the present study an attempt is made to study the variations of arteries supplying caecum.

MATERIALS AND METHODS: The arterial supply of the caecum was studied in 52 specimens. The specimens (caecum with appendix and part of ascending colon and ileum) were collected with their arteries intact from the postmortem centre and dissection hall (Department of anatomy), of J.J.M medical college Davangere and S.I.M.S & R.C Mangalore.

Thus collected specimens were preserved in 5% formalin. After the preservation the specimens were dissected cleaned and numbered. The ileocolic artery and its branches to the caecum were traced carefully and observations were recorded.

RESULTS: The arterial supply of human caecum was studied by dissection method in 52 specimens. All the branches of the ileocolic artery have been dissected and traced till their termination with special attention to the caecal branches and variations have been noted down.

ORIGIN OF ILEOCOLIC ARTERY: In the present study the ileocolic artery originated from the superior mesenteric artery in 50 specimens (96.15%) and in 2 specimens (3.84%) it was originating in common with the right colic artery.

TERMINATION OF ILEOCOLIC ARTERY: The ileocolic artery ends by dividing into superior and inferior divisions in 50 specimens (96.15%); into ascending colic, common caecal and ileal branches in 1 specimen (1.92%); and into anterior caecal, posterior caecal, appendicular and ileal branches in 1 specimen (1.92%).

COMMON CAECAL ARTERY: The common caecal artery arises from inferior division in majority of cases 48 specimens (92.30%); from superior division in 3 specimens (5.76%) and from ileocolic artery in one specimen (1.92 %).

ANTERIOR CAECAL ARTERY: The anterior caecal artery arises from the common caecal artery in 30 specimens (57.69%); inferior division in 10 specimens (19.23%); superior division in 7 specimens (13.46%); ileal branch and arterial arcade in 2 specimens each (3.84%) and in one specimen directly from ileocolic artery (1.92%).

One specimen showed an additional anterior caecal artery (1.92%).

POSTERIOR CAECAL ARTERY: The posterior caecal artery arises from the common caecal artery in 30 specimens(57.69%);superior division in 12 specimens (23.07%);inferior division in 5 specimens (9.61%); ileocolic artery, ascending colic branch of inferior division and ileal branch in one specimen each (1.92% each) and from an arterial arcade in 2 specimens (3.84%).

3 specimens showed additional posterior caecal arteries (5.765).
2 specimens showed two anterior and two posterior caecal arteries (3.84%).

DISCUSSION: In the present study, 52 specimens were studied for the arteries supplying the human caecum. The findings of the study have been compared with those of previous workers on the subject.

ORIGIN OF ILEOCOLIC ARTERY: In the present study the ileocolic artery originated from the superior mesenteric artery in 50 specimens (96.15%) and in 2 specimens (3.84%) it was

originating in common with the right colic artery. Barry j.Anson[1]mentions the origin of ileocolic artery independently from the superior mesenteric artery in 65% of cases and in 35% of cases it arises in common with the right colic artery. The origin of ileocolic artery either independently or in common with the right colic artery has also been mentioned byPiersol[2],and others (3, 4)

TERMINATION OF ILEOCOLIC ARTERY: In our study, the ileocolic artery ends by dividing into superior and inferior divisions in 50 specimens (96.15%); into ascending colic, common caecal and ileal branches in 1 specimen (1.92%); and into anterior caecal, posteriorcaecal, appendicular and ileal branches in 1 specimen (1.92%).

Solanke. T. F[5] mentions that the division of ileocolic artery into medial and lateral branches of unequal caliber is found in only 15% of cases; remaining 85% of the cases it remains single. Cunnigham[3] illustrates the termination of ileocolic artery into ascending and descending branches.

Michel R B[4] also describes the termination of the ileocolic artery into ascending colic and the descending branch which divides into anterior caecal, posterior caecal, appendicular and ileal branches. Patrick W [6] states the termination of the ileocolic artery into colic and ileal branches, which is similar to findings of the present study.

In the present study in one specimen (1.92%) the ileocolic terminates by dividing into ascending colic, common caecal, and ileal branches. The findings are similar to the same finding by,Schaffer[7],Vandamme J P [8]and others (2, 9)Grant's [10] states the similar pattern of division of ileocolic artery into four branches anterior caecal, posterior caecal, appendicular and ileal as in our present study.

COMMON CAECAL ARTERY: In the present study the anterior and posterior caecal arteries take their origin by a common trunk in 30 specimens(57.69%).Piersol[2], Anson and Mcvey[11] mentioned the same in their study that the anterior and posterior caecal arteries arise by a common trunk (common caecal artery).Michel and co-workers [12] in their study found the anterior and posterior caecal arteries arising from a common trunk in 36% of cases. Ures et al. [13] mentioned the same in 76.2% of cases and Bergmann [14] in 13.5% of cases (unpublished report of Beaton, Anson, Swigart, and Jamieson).

ORIGIN OF COMMON CAECAL ARTERY (IN 57.69%): In the present study, the common caecal artery arises from inferior division in majority of cases 26 specimens (50%); from superior division in 3 specimens (5.76%) and from ileocolic artery in one specimen (1.92 %).

Michel and co-workers [12] mentioned the origin of the common caecal artery from an arcade between colic and ileal branches in 76%, less frequently from either ascending colic or ileocolic trunk. Anson and Mcvey[11] have mentioned the origin of common caecal artery from the arcade between colic and ileal branches or separately from colic and ileal branches. Ures et al. [13] mentioned the origin of common caecal artery from the right colic artery in 15% and from the ileal branch in 61.2% of cases. Bergmann [14]mentioned the origin of common caecal artery from the ileocolic artery.

ANTERIOR AND POSTERIOR CAECAL ARTERIES

In the present study,

The anterior and posterior caecal arteries arise from a common trunk(common caecal artery) in 30 specimens(57.69%) The anterior and posterior caecal arteries had separate origin without a common trunk in 22 specimens (42.30%).
The various sources of anterior and posterior caecal arteries are as follows:

ORIGIN OF ANTERIOR CAECAL ARTERY: The anterior caecal artery arises from the common caecal artery in 30 specimens (57.69%); inferior division in 10 specimens (19.23%); superior division in 7 specimens (13.46%); ileal branch and arterial arcade in 2 specimens each (3.84%) and in one specimen directly from ileocolic artery (1.92%).

ORIGIN OF POSTERIOR CAECAL ARTERY: The posterior caecal artery arises from the common caecal artery in 30 specimens(57.69%);superior division in 12 specimens (23.07%);inferior division in 5 specimens (9.61%); ileocolic artery, ascending colic branch of inferior division and ileal branch in one specimen each (1.92% each) and from an arterial arcade in 2 specimens (3.84%).

Schaffer[7]and several other workers (1, 4, 15, 16, 17) have mentioned that the anterior and posterior caecal arteries originate directly from the ileocolic artery.

Michel and co-workers [12] stated that the anterior and posterior caecal arteries arise separately in 64% of cases. The most common origin for both arteries is from an arcade in between colic and ileal branches in 76%, less frequently from colic, ileal or ileocolic artery.

Hamilton [18] has mentioned the origin of anterior and posterior caecal arteries from the inferior division of the ileocolic artery. Ures et al [13] have mentioned the origin of anterior and posterior caecal arteries separately in 23.7%. In 8.7% of cases the anterior caecal artery had its origin from the right colic artery and posterior caecal artery directly from the ileal branch. In 13.8% of cases both caecal arteries originated directly from the ileal branch and in 1.2% of cases the anterior caecal artery originated from the right colic artery and posterior caecal artery from the ileocolic artery. Bergmann [14] mentioned the origin of both caecal arteries directly from the ileocolic artery in 28.5% cases and in 4% of cases from the arcade between right colic and ileal branches. Kozmithet al.[19]mention the origin of both caecal arteries from the ileocolic loop formed between ileal and colic branches. Patrick W [6] states the origin of both the caecal arteries from the ileal branch.
In the present study some of the specimens showed additional anterior or posterior caecal artery.

Specimen no.18 showed an additional anterior caecal artery from ileal branch. Specimen no.1 showed additional posterior caecal artery from an arcade between posterior caecal and ascending colic branch. Specimen no.42 and 47 showed additional posterior caecal arteries from superior and inferior divisions respectively.

Anson and Mcvey[11] described one anterior caecal and two posterior caecal arteries originating from an arcade by a common trunk. Bergmann [14] mentioned the origin of three posterior caecal and one anterior caecal arteries from the ileocolic artery in 6.5% of cases (unpublished report of Beaton, Anson, Swigart and Jamieson).

CONCLUSION: In the present study on the arterial supply of human caecum shows that the origin of ileocolic artery is from the right side of the superior mesenteric artery independently and it terminates by dividing into superior and inferior divisions in majority of cases.

There is common caecal artery in more than half of the cases (57.69%), which originated from inferior division in 50%; superior division 5.76% ; and ileocolic artery in 1.92% of cases.

In 57.69% of the specimens the anterior and posterior caecal arteries originate from the common caecal artery. Other sites of origin for anterior caecal artery are superior division 13.46%; inferior division 19.23%; ileocolic artery 1.92%; ileal branch and arterial arcade in 3.84 specimens each.

Other sites of origin of posterior caecal artery are superior division 23.07%; inferior division 9.6%; from ileocolic artery, ascending colic branch of inferior division and ileal branch in 1.92% each; from an arterial arcade in 3.84% of cases.

7.69% of specimens showed additional anterior and posterior caecal arteries.

Separately from superior mesenteric artery	50 specimens	96.15%
In common with right colic artery	2 specimens	3.84%

Superior and inferior division	50 specimens	96.15%
Ascending colic, common caecal, &ileal branches	1 specimen	1.92%
Anterior caecal, posterior caecal, appendicular &ileal branches	1 specimen	1.92%

Superior division	3 specimens	5.76%
Inferior division	26 specimens	50%
Ileocolic artery	1 specimen	1.92%

Common caecal artery	30 specimens	57.69%
Ileocolic artery	1 specimen	1.92%
Superior division	7 specimens	13.46%
Inferior division	10 specimens	19.23%
Ileal branch	2 specimens	3.84%
Arterial arcade	2 specimens	3.84%

Common caecal artery	30 specimens	57.69%
Ileocolic artery	1 specimen	1.92%
Superior division	12 specimens	23.07%
Inferior division	5 specimens	9.61%
Ileal branch	1 specimen	1.92%
Arterial arcade	2 specimens	3.84%
Ascending colic branch of inferior division	1 specimen	1.92%

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