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Study Of Suprior Mesentric Artery And Blood Supply Of Caecum And Appendix In Dead Fetuses

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Abstract: ***Morphometry of superior mesenteric artery is very much essential to Endovascular surgeons. Extensive knowledge of distribution of superior mesenteric artery, distribution of it to various organs are essential for organ transplantation, angiography and other surgical interventions. Superior mesenteric artery is the end aretery of organ and it is the artery of mid-gut in embryonic stage. Translucently this is seen in X ray across the duodenum in most of the times. Caecum and appendix are supplied through SMA (Superior mesenteric artery). Position of the artery during embryonic stage in sub-hepatic region and in the adults it will be in right iliac fossa.***

The present study was designed to study of the any variations of SMA during developmental changes of caecum. And the knowledge of SMA morphometry is necessary to Pediatric Surgeons in different maneuvers. Length of the artery from its origin to commencement of ileocolic branch in adult male is 8.32 cms and in adult female is 7.35 cms. In fetuses it varies with age. The present study was conducted on 35 dead fetuses and 15 adult cadevers. Following were the findings of the study:

- ***There are no fistulous communications between artery and veins and also there are no dilated segments of the vessel thus showing that congenital aneurismal dilatations are not common.***
- ***There is a evidence of coeliaco mesenteric anastomosis which is shown by origin of middle colic and right colic arteries arising by a common trunk from the hepatic artery and inferior pancreatico duodenal artery from the celiac trunk.***
- ***Inferior pancreatico duodenal artery is seen as a branch coming from middle colic artery in one adult out of 15 (0.66%)***
- ***There are no variation observed between the relation of superior mesenteric artery and the vein.***
- ***There are no abnormal vessels taking origin from superior mesenteric artery.***
- ***there is an anastomotic vessel seen between sigmoidal branch of inferior mesenteric artery and left branch of middle colic artery in one fetal specimen.***
- ***caecal vessels are two sets (anterior and posterior) in concurrence with general description.***
- ***Appendicular artery is single and arising from ileocolic artry in 34 (97%)***
- ***fetal specimens and single in all adult specimens (100%) . In fetal specimen appendicular artery is double.***

The authors concluded based on the observations made in their study that growth is at a faster rate in the first and second trimesters of pregnancy.

Keywords: Superior Mesenteric Artery (SMA), Caecum, Appendix, Morphometry

1. Introduction

Modern Medicine is built on understanding of basic sciences like Anatomy, Physiology and Biochemistry. Modern medical and surgical procedures are dependent on understanding of these sciences. Extensive knowledge of blood supply to the gut is very essential for understanding and for performing various surgical procedures by General Surgeons, Gastroenterologists and vascular surgeons. For appropriate surgical approach, per-operative surgical knowledge of abnormal vasculature is essential and required.

Caecum during foetal stage, is in the shape of inverted funnel and subsequently in the process of development it reaches adult stage in the form of spherical form. Length of the artery In full term baby, SMA similar to the adult pattern of distribution but during initial period of gestation, various forms of developmental pattern was observed in the studies conducted early. At fetal level the length of the artery is almost same in both sexes, but in adult specimens the artery is lengthier in male specimen than in the female specimen. The growth in the length of the artery in the early months is more. The increase in the length is 4.2 mm from 20-24 weeks, and 6.5 mm from 24-30 wks. The increase in the length of the artery from 36-38 wks is almost 1.8 mm each.

Extensive knowledge of the blood supply to the gut is very essential for understanding and for performing various surgical

procedures by general surgeons, gastroenterologists and endovascular surgeons. pre operative knowledge of vascular anomalies is critical for planning appropriate surgical approach .A thorough knowledge of superior mesenteric artery ,its distribution and morphometry are very important for endovascular surgeons with increase in the incidence of surgical procedures like organ transplantation and selective vascular angiography ,there is increased need for in-depth knowledge of each and every minute vessel .this has instigated the author to study the superior mesenteric artery and its distribution .

superior mesenteric artery is an end artery (Gray 1995) .It represents the embryonic artery of the midgut. some times it is seen in the X-ray as an area of translucency running across the duodenum .at one time this was thought to represent sphincter (sphincter of ocher) to which all the symptoms of obstruction were attributed , but this was disproved by endoscopy.

Caecum and appendix receive their blood supply from the branches of the superior mesenteric artery .Caecum is conical shape (infundibular) in early fetal period. subsequently it attains the definitive adult shape .Position –wise also initially it is subhepatic and subsequently it reaches its normal adult position in right iliac fossa. Because of these changes in shape and position of caecum and appendix during development a brief study was conducted to see whether there is any difference in blood supply to them.

Surgical maneuvers on neonates are on the increasing side with the establishment of paediatric surgery departments .Fetal anatomy (full term fetus)is almost same as that of adult anatomy with regards to branching pattern of vessels .Hence an attempt is made to study the gross features of superior mesenteric artery and its variations in foetus and in few adult specimens , attention is also given to the caecum and appendix and their blood supply.

2. OBJECTIVES:

1. To study the SM artery in the dead fetuses and adult cadavers
2. To observe any anomalies in the SM artery
3. To study any abnormal origin or branching of the artery
4. To study any deviation in the physical structure in the artery
5. To study any variations in the blood supply of caecum and appendix
6. To correlate previous studies in the SMA

3. METHODOLOGY:

The material for the present study comprises of 35 dead fetuses of different age groups and sex received from Govt. Maternity Hospital, Sultan Bazar, Hyderabad, and fifteen adult cadavers of the known sex used for routine student dissections the fetuses was determined by measuring the crown rump length(CRL) and footlength(FL) and head circumference (HC) (Keith Dewbury,1993). The results are tabulated.

After receiving the dead fetuses into the Anatomy Department, the weight and sex were noted and thoroughly washed. They were injected with 10% formalin through umbilical vein and by local injection into abdominal cavity. The fetuses were left for four days for optimum fixation and proper fixation, the abdomen was opened by a midline incision and gently the greater omentum was lifted.The small intestinal loops were lifted with forceps and the superior mesenteric artery was identified. It crosses in front of second part of the duodenum and covered by

uncinate process of pancreas. The artery and its branches were cleared from its commencement and search was made for its branches. After identifying the commencement of the artery, the following observations are noted.

1. Length of the artery from the origin to commencement of ileo colic branch.
2. The origin of Middle colic, Rt Colic, caecal branches and appendicular artery
   and many variations.
3. Any dilation of any segment of superior mesenteric artery.
4. Any variations in the relation of superior mesenteric artery and the vein.
5. Presence or absence of arterio venous fistulae.
6. Any facial sheath around the vessel.
7. Any abnormal origin of the superior mesenteric artery from any other artery
8. Any other arteries taking origin either from superior mesenteric artery or its branches.

   Blood supply to caecum and appendix was observed and variations in the branching pattern and variations in number of vessels are noted. Incidentally position and shapes of caecum and position of the appendix are also studied in few specimens where there were abnormalities.

4. OBSERVATIONS & DISCUSSIONS:

The age of fetus is determined by taking the crown rump length (CR)foot length (FL) and head circumference (HC). They varied from 20 weeks to 34 weeks. Among these apparent, physical abnormalities noted were.

1. Anencephaly
2. Meningocele
3.Talipes equino varus
4. protruding eye balls
5. web neck

OBSERVATIONS ON FETAL SPECIMENS:

In all the specimens superior mesenteric artery is arising as a separate branch directly from the anterior surface of the aorta below the celiac trunk . the total number of jejuno-ileal branches are found to be uniformly 14-16 and arising on the left side of the superior mesenteric artery.

Length of artery is measured from its commencement to the ileoceacal branch.Average lengths of the vessels at different age groups of fetuses is tabulated.(table-1).It varied from 10mm (20 weeks fetus) to 30mm (38 weeks fetus). At 20 weeks average length is 12.3mm ; at 24 weeks it is 16.5 mm; at 30 weeks it is 23mm and 34 weeks and 36weeks it is 27mm (only one specimen of 36 weeks available) and at 38 weeks it is 28.5 mm (Table-3). Average length of the vessels was compared between male and female fetuses it was 22 mm in both sexes.

Findings on adult cadavers are also tabulated (Table-2) Different branches arising from the superior mesenteric artery including the variations are tabulated in fetuses (Table-4,5) and in adults (Table-6,7).

Appendicular artery is arising from ileo colic and as a single branch in 34 specimens and as a double artery in one

specimen . In 33 specimens one set of the caecal branches are seen , i.e, anterior and posterior : in two specimens two sets of caecal vessels are seen.

One specimen of 30 weeks gestation has abnormally enlarged kidney with few coils of small intestine and caecum in sub hepatic and infundibular . Stomach is contracted and is horizontally placed (?steer horn stomach) (Fig:3). Appendix is seen to descend down from the apex of caecum and it is curved upwards and to the right infront of caecum. This specimen showed right colic artery arising in common with middle colic artery from a common stem(Fig:4a,4b) .

One fetus showed gross abnormalities in the gut. There are several stenotic segments in the small bowel loops and large gut with abnormally dilated second third and fourth part of duodenum(Fig: 5,8) . This specimen showed many peritoneal bands running across the gut loops. there are narrow segments of large bowel also. In additional to its normal course and branching of superior mesenteric artery (Fig:6 and 7). one branch arises from the left of middle colic artery and anastomoses with sigmoidal branchs of inferior mesenteric artery.(Fig:9).

In another specimen the appendix is Pre-ileal and it is curved upon itself with tip pointing to the right into 10 O'clock position.There is no variation in blood supply of the appendix in this specimen.(Fig:10).

one specimen of 36 weeks gestation showed sub-hepatic caecum, which is infundibular in type . In this specimen there is no abnormality in the origin of the superior mesenteric artery , but the middle colic artery is arising in common with the right colic artery from hepatic artery(Fig:11,12). Length of superior mesenteric artery from its origin to its ileocolic branch is 22mm (2.2 cm).this is shorter when compared to other same age group fetuses.

one specimen showed atresia of segments of descending colon with dilated regions of sigmoid colon . superior mesenteric artery in this specimen is normal in course and its branching pattern (Fig: 13) .In another specimen where the superior mesenteric artery is normal , Inferior pancreatico duodenal artery is arising from celiac trunk.(Fig-14).

One specimen of 24 weeks of gestation right colic is arising from ileocolic (Fig:15).

In the rest of the specimens though there are gross abnormalities like anencephaly, talipes equino varus and meningocele, no variations are observed in the superior mesenteric artery or its branching pattern.

observations on adult specimen: 15 adult cadavers were dissected and the superior mesenteric artery was studied. Its measurements are tabulated (Table no.2).

The average length of artery in female cadavers is 7.5 cm and in male cadavers is 8.32 cm. this shows that artery is shorter in females.

All the specimens showed normal branching pattern except one which showed origin of inferior pancreatico duodenal from middle colic artery.

out of 35 fetal and 15 adult specimens following features are not seen in any one specimen.

i) dilatation of vessel in any segments

ii) Variation in relationship of artery and vein

iii) presence of arteriovenous communications and any fascial sheath around the vessel

TABLE 1 : AGE OF FETUS AND AVERAGE LENGTH OF SMA IN mm

Age in weeks	Average length of SMA	Increase in Length corresponding
20 wks	12.3	From 20 wks to 24 wks - 4.2mm
24 wks	16.5	From 24 wks to 30 wks - 6.5mm
30 wks	23	From 30 wks to 34 wks - 4mm
34 wks	27	From 34 wks to 36 wks Minimum
38wks	28.5	From 36 wks to 38 wks difference is same i.e 1.8

TABLE 2 : LENGTH OF SUPERIOR MESENTRIC ARTERY IN ADULT CADAVERS

S.No	Cadaver no	Sex	Length
1	Cad.1	F	8 cm
2	Cad.2	F	7.2 cm
3	Cad.3	M	8.8 cm
4	Cad.4	M	8.6 cm
5	Cad.5	F	7 cm
6	Cad.6	M	8 cm
7	Cad.7	M	8.2 cm
8	Cad.8	M	8.5 cm
9	Cad.9	M	8.2 cm
10	Cad.10	M	8.5 cm
11	Cad.11	F	7.5 cm
12	Cad.12	F	7.7 cm
13	Cad.13	M	8.2 cm
14	Cad.14	M	8.0 cm
15	Cad.15	M	8.2 cm

All the cadavers ranged roughly between 55- 70 yrs age.

TABLE NO.3: AVERAGE LENGTH OF SMA AGE WISE FROM ORIGIN TO THE ILEOCOLIC BRANCH

Age in weeks	**Average length of SMA**
20 Wks	12.3 mm
24 Wks	16.5 mm
30 Wks	23.0 mm
34 Wks	27.0 mm
36 Wks	27.0 mm
38 Wks	28.5 mm

Sex wise classification is not done as specimen number is small

TABLE NO 4: SUPERIOR MESENTRIC ARTERY AND ITS BRANCHES IN FETUSES

S.No	Inferior pancreatico duodenal artery	Right colic	Middle colic	Ileo colic	Caecal branches Anterior	Appendicular branches
1	+	+	+	+	1+ 1+	1+
2	+	+	+	+	1+ 1+	1+
3	+	+	+	+	2+ 2+	1+
4	+	--	+	+	1+ 1+	1+
5	+	+	+	+	1+ 1+	1+
6	+	+	+	+	1+ 1+	1+
7	+	+	+	+	1+ 1+	1+
8	+	--	+	+	1+ 1+	1+
9	+	+	+	+	1+ 1+	1+
10	+	+	+	+	1+ 1+	1+
11	+	+	+	+	1+ 1+	1+
12	+	+	+	+	1+ 1+	1+
13	-	+	+	+	1+ 1+	1+
14	+	+	+	+	1+ 1+	1+
15	+	+	+	+	2+ 2+	1+
16	+	+	+	+	1+ 1+	1+
17	+	+	+	+	1+ 1+	1+
18	+	+	+	+	1+ 1+	1+
19	+	--	--	+	1+ 1+	1+
20	+	+	+	+	1+ 1+	1+
21	+	--	+	+	1+ 1+	1+
22	+	+	+	+	1+ 1+	1+
23	+	+	+	+	1+ 1+	1+
24	Right & Middle colic arising from same point		+	+		1+ 1+
25	+	+	+	+	1+ 1+	1+
26	+	+	+	+	1+ 1+	1+
27	+	+	+	+	1+ 1+	1+
28	+	+	+	+	1+ 1+	1+
29	+	+	+	+	1+ 1+	1+
30	+	+	+	+	1+ 1+	2+
31	+	+	+	+	1+ 1+	1+
32	+	+	+	+	1+ 1+	1+
33	+	+	+	+	1+ 1+	1+
34	+	+	+	+	1+ 1+	1+
35	+	+	+	+	1+ 1+	1+

TABLE NO 5: VARIATION SUPERIOR MESENTRIC ARTERY IN FETUSES

S. No	AV Fistula	Abnormal Dilatation	Abnormal branches of SMA	Other variations
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	Rt .colic arising from ileocolic branch	-
5	-	-	-	-
6	-	-	-	-
7	-	-	-	-
8	-	-	Rt colic is arising from middle colic	-
9	-	-	-	-
10	-	-	-	-
11	-	-	-	-
12	-	-	-	-
13	-	-	-	-
14	-	-	-	-
15	-	-	-	-
16	-	-	-	-
17	-	-	-	-
18	-	-	-	-
19	-	-	**Middle colic arising from hepatic artery**	-
20	-	-	-	-
21	-	-	**Rt.colic & Middle arising from same point**	-
22	-	-	-	-
23	-	-	-	-
24	-	-	**Rt.colic & Middle arising from same point**	-
25	-	-	-	-
26	-	-	-	-
27	-	-	-	-
28	-	-	-	-
29	-	-	**Inf.Pancreatico**	-

			duodenal arising from celiac trunk	
30	-	-	**Rt.colic & Middle arising from same point**	-
31	-	-	-	-
32	-	-	-	-
33	-	-	-	-
34	-	-	-	-

TABLE NO 6: SUPERIOR MESENTRIC ARTERY AND ITS BRANCHES IN ADULT CADAVERS

S. No	Inferior pancreatico duodenal artery	Right colic	Middle colic	Ileocolic	Caecal branches Anterior posterior	Appendicular Branches
1	+	+	+	+	1+ 1+	1+
2	+	+	+	+	2+ 2+	1+
3	+	+	+	+	1+ 1+	1+
4	+	+	+	+	1+ 1+	1+
5	+	+	+	+	1+ 1+	1+
6	+	-	+	+	1+ 1+	1+
7	+	+	+	+	2+ 2+	1+
8	+	+	+	+	1+ 1+	1+
9	+	+	+	+	1+ 1+	1+
10	+	+	+	+	1+ 1+	1+

TABLE NO 7: VARIATION SUPERIOR MESENTRIC ARTERY IN ADULT SPECIMEN

S.No	AV Fistula	Aneurysm	Abnormal branches of SMA	Other variations
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
6	-	-	Inferior pancreatico duodenal arising from Middle colic artery	-
7	-	-	-	-
8	-	-	-	-
9	-	-	-	-
10	-	-	-	-

The superior mesenteric artery and its distribution are of great surgical importance as the viability of the gut depends onits blood supply. With the advent of many modern tools and invasive and noninvasive procedures the superior mesenteric artery's anatomy is studied extensively. In the present study the superior mesenteric artery is studied with regards to its course, branching pattern variations and abnormalities and the same findings are made to bring into light the additional features.

Study material comprised of 35 fetal and 15 adult specimens. No gross deviation is seen in the origin and the course of the superior mesenteric artery which is in concurrence with standard text book description.

Basmajian,1995,Hollinshead 1961[2]; Peter Williams et al 1995 : mentioned arc of Riolon . In the present study one specimen presented a communicating vessel from the left branch of the middle colic to the sigmoid branch of the inferior mesenteric artery (Fig.9).Though the typical arc of Riolon is not seen this vessel is a communicating branch from middle colic artery to sigmoidal branch of Inferior mesenteric artery.

Clausen in 1955[3] reported the absence of celiac artery and origin of splenic artery from superior mesenteric artery .No such variation is seen in the present study.

Ravadin[3] reported in some cases the superior mesenteric artery may be double but no such variation is seen presently.

Angiographic and Ultrasonographic studies were done by many authors . Gross findings of present study are compared with their findings.

Garuse GF and Chianura (1996), Savchenko AP (1972)and others[5] have given angiographic data. Efleev VP (1973) carried out anatamo roentgen logical study.

Vandamme JP et al 1976[11] explored 156 abdominal preparations by dissection corrosion and arteriography. they found that in 12 cases both mesenteric arteries were linked by intermesentric arch and the right colic artery was found in 13% of abdominal preparations. Ileocolic artery provided a ramus colicus which was often confused with true arteria colica dextra (Rt.colic) .where as in the present study right colic is present in all the specimens as a direct branch from superior mesenteric artery except in 6 out of 35 fetal specimens in which it is not a direct branch of superior mesenteric artery . The right colic is present in 83% of fetal specimens and 100% in adult specimens which is in gross contrast to their findings.

Wicke L et al (1977)[12] in the radiological and anatomical material classified anastomosis between celiac and superior mesenteric artery into four groups.

1. Buhlar's longitudinal anastomosis

2 . in pancreatico duodenal region

3. anastomosis in the hepatic region

4. atypical cases

In the present study out of 50 specimens including fetal and adults one specimen has shown middle and right colic arteries arising by a common trunk from the hepatic artery and another specimen has shown inferior pancreatico duodenal artery from the celiac trunk, thus making the anastomosis one in hepatic region and other in pancreatico duodenal region.

Goldberg (1977)[13] made an ultra sonic evaluation of the superior mesenteric artery and measured the aorto mesenteric angle , its distance and lumen diameter which are helpful in selecting proper catheter for arteriography. Presently the study was not made and hence no comparison could be made.

Kitamura s et al (1987)[17] reported a case of the inferior mesentric artery arising from the superior mesenteric artery. No such variations is seen presently. this is in contrast to observations of Kitamura s et al.

Wachsberg RH et al ,(1996)[23] observed out of 30 patients where the hepatic artery was entering the portocaval space , in

18 specimens the hepatic artery was arising from superior mesenteric artery and in 12 from celiac tunk. such an origin is not seen in the present work. this is in contrast to the findings of the Wachsberg RH et al.

Cavedar S et al (1997)[25] described a celiac mesenteric trunk from which celiac trunk and superior mesenteric artery took origin but no such variation is seen in the present study.

Ray CE jr, Gupta Ak.Shenoy SS (1998)[26] reported two cases of left gastric artery arising from the superior mesenteric artery.No such variation is seen in the present study.

Sakamoto H et al (1999)[27]described an anomalous origin of right gastro epiploic artery from superior mesenteric artery in a routine dissection. this is an enlarged pancreatic branch arising from the superior mesenteric artery mainly supplied anterior surface eof pancreas and this continued to become the right gastroepiploic artery. This type of variation is also not seen in the present study.

Weber BM, Freeman NU ,(1999)[28] reported in a Down's syndrome complete absence of branches from the superior mesenteric artery absence of 3rd and 4th part of duodenum and proximal jejunum with apple peel configuration of the rest of the small bowel and an annular pancreas. No such abnormalities are observed.

Torres A et al in (1999)[29] reported congenital absence of superior mesenteric artery . this condition was associated with the absence of jejunum, ileum, appendix and right colon. Such abnormalities like absence of branches from superior mesenteric artery or total absence of superior mesenteric artery itself are not observed in present study. instead there is a fetus which has multiple attretic regions in both small and large instestine and abnormally dilated duodenum with peritoneal bands. (Fig.8 & 13).Origin and course of the superior mesenteric artery are normal but there is a vessel connecting the left branch of the middle colic artery to the sigmoidal branch of inferior mesenteric artery (Fig 9).This type of communication was not described by any .

Dalcik et al (2000)[30]reported an anomolus origin of thre right renal artery and superior mesenteric artery from the common trunk but no such variation is seen in the present study.

Hentati N et al (2001)[33] reported the double hepato mesenteric artery i.e., two persisting hepatic arteries from superior mesenteric artery but no such vessels are seen in the present study.

Monulty JG et al (2001)[34] described the variations of arterial anastomosis between the celiac trunk and superior mesenteric artery . Presently one specimen has middle colic and right colic arising by a common trunk from hepatic artery(Fig:2) (a branch of celiac trunk) and another specimen has inferior pancreatico duodenal directly from celiac trunk and superior mesenteric artery which in concurrence with the findings of MoNulty JG.

Nonent M et al (2001)[36] presented a variation where the celiac , superior mesenteric artery and inferior mesenteric have common origin and this variant they called as celiac bi mesenteric trunk but presently no such rare origin of three vessels together is seen.

Carahan NC et al (2001) reported the origin of common hepatic artery from superior mesenteric artery in an 8 ½ month girl . In the same case there was a circum aortic renal vein . such variation is not seen in any of the present specimen.

measurement of the vessel could not be compared , as the figures of authors are not available. The length is more in male than in the female .But it is found to be equal in male and female fetuses. How ever it couldnot be compared because the specimens belong to different ages of gestation.

Blood supply of the appendix is important because of its frequent involvement in infections and surgical emergencies. It has been established that the main supply to the appendix is from ileocolic artery . many authors are of the opinion that appendix has a single artery , but shah and shah (1946) ,Sehaeffer (1953),solanke (1968) observed that appendix receives more than one branch .According to Hollinshead (1961) appendicular artery has varied origin either directly from ileocolic or from ileal branch of this or from either the anterior or posterior caecal arteries or both.According to shah and shah 70% had single artery and 30% has two branches . In the present study out of 35 fetal specimens one specimen showed double appendicular artery arising from ileocolic and rest of 34 fetal and 15 adult specimens the artery is single and arising from the ileocolic i.e, in 100% in adult and 97% in fetal apecimens the artery is single. This is in contrast to the findings of shah and shah.

Caecum receives set of anterior and posterior caecal arteries . Two fetal specimens have two anterior caecal and two posterior caecal vessels. The rest of the specimen have only one set of arteries.

5. SUMMARY AND CONCLUSION

superior mesenteric artery is studied in 35 fetal and 15 adult specimens .The study is made with regards to its origin , length, branching pattern, variations, aneurismal dilatation, arteriovenous fistula (communication) . Difference in measurements of artery in both sexes and ages of fetuses noted. The same are tabulated and compared with other authors , the observations are summarized and the following conclusions are made.

1. Length of the artery

    a) Length of the artery from its origin to commencement of ileocolic branch in adult male is 8.32 cms and in adult female is 7.35 cms. In fetuses it varied with age.

    b) At fetal level the length of the artery is almost same in both sexes, but in adult specimens the artery is lengthier in male specimen than in the female specimen.

The growth in the length of the artery in the early months is more. The increase in the length is 4.2 mm from 20-24 weeks, and 6.5 mm from 24-30 wks. The increase in the length of the artery from 36-38 wks is almost 1.8 mm each. Thus we conclude that growth is at a faster rate in the first and second trimesters of pregnancy.

2. There are no fistulous communications between artery and veins and also there are no dilated segments of the vessel thus showing that congenital aneurismal dilatations are not common.

3. There is a evidence of coeliaco mesenteric anastomosis which is shown by origin of middle colic and right colic arteries arising by a common trunk from the hepatic

artery and inferior pancreatico duodenal artery from the celiac trunk.

4. Inferior pancreatico duodenal artery is seen as a branch coming from middle colic artery in one adult out of 15 (0.66%)

5. There are no variation observed between the relation of superior mesenteric artery and the vein.

6. There are no abnormal vessels taking origin from superior mesenteric artery.

7. there is an anastomotic vessel seen between sigmoidal branch of inferior mesenteric artery and left branch of middle colic artery in one fetal specimen.

8. superior mesenteric artery itself is not coming from any other vessels than from aorta.

9. caecal vessels are two sets (anterior and posterior) in concurrence with general description.

10. Appendicular artery is single and arising from ileocolic artry in 34 (97%) fetal specimens and single in all adult specimens (100%) . In fetal specimen appendicular artery is double.

REFERENCES:

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