

Multidetector Helical CT -angiography 가¹

: multidetector helical CT technology oblique thick - slab maximal intensity projection(MIP) hepatic angiography

가
: 가 multidetector helical CT technology CT
70 CT multidetector helical CT
, 4 cc/sec 120 cc ,
, high speed
mode, (slice thickness) 2.5 mm, table speed 15 mm/rotation , 25
, 1.25 mm . Computer
workstation(Advantage Window Voxel 3.03, GE system) MIP
CT - angiography .

: , , ,
. 70 53 (75.7%) .
(LH - LG) 8 (11.4%), (RH - SM) 3
(4.3%), (RH - GD) 2 (2.6%) .
가 1 ,
(hepatomesenteric trunk) 1 ,
(hepatogastric/splenoenteric trunk) 1 ,
(celiomesenteric trunk) 1

: Multidetector helical CT CT
가 , 가
 , 가
 .

(variants) 가 가
(celiac trunk) (hepatic
branches) (hepatic lobes) (2).
25 - 75 % (1). 가 ,
(superior mesenteric artery), CT (axial CT image)
(left gastric artery), (aorta), CT
(visceral branches) (variant hepatic artery)
가 가
(accessory branch) ,
(replaced branch)

CT

가

(3). high pitch
multidetector helical CT

가 가

CT workstation

5 - 10 , MIP
CT 15 - 30 (25)

(hepatic artery), (splenic artery)
(gastroduodenal artery)
(proper hepatic artery) 3 - 4
. 70 53 (75.7%)
(left hepatic artery)
(LH - LG) 8 (11.4%), (right hepatic artery)
(RH - SM) 3 (4.3%),
(RH - GD) 2
(2.6%)
가 1 ,
(hepatomesenteric trunk) 1 ,
(hepatogastric/splenomesenteric trunk) 1 ,
(celiomesenteric trunk) 1
(Table 1).

가

가 , , ,
가

가

. Michels (4)
(common hepatic artery) ,
55%

가

(fissure for
ligamentum venosum) - (porto - caval
space)

1 ,

1 .

Table 1. Findings on 3D CT Hepatic Angiography

Anatomy	Case(%)
Typical normal anatomy	53(75.7)
Anatomic variation	17(24.3)
LH arising from LG	8(11.4)
RH arising from SM	3(4.3)
RH arising from GD	2(2.6)
PH arising from LG	1(1.3)
Hepatomeseneric trunk	1(1.3)
Hepatogastric/splenomesenteric trunk	1(1.3)
Celiomesenteric trunk	1(1.3)

LH : left hepatic artery, LG : left gastric artery

RH : right hepatic artery, SM : superior mesenteric artery

GD : gastroduodenal artery, PH : proper hepatic artery

(5).

(cadaver)
(4, 6 - 12).

Michels (4)
200 107가

55% , 가
(replaced left hepatic artery)

(replaced right hepatic artery) 20 (10%) 22
(11%) (accessory left hepatic
artery) 16 (8%), (accessory right hepatic
artery) 14 (7%) . Brems (13) 172
Michels 67가 (mod -
ified Michels ' classification)

(5) 2000 Michels

가 60% ,
가 75% .
15%,
11%,
3%

(vascular map)

(collat -
eral vessel) (14).
가 .
가

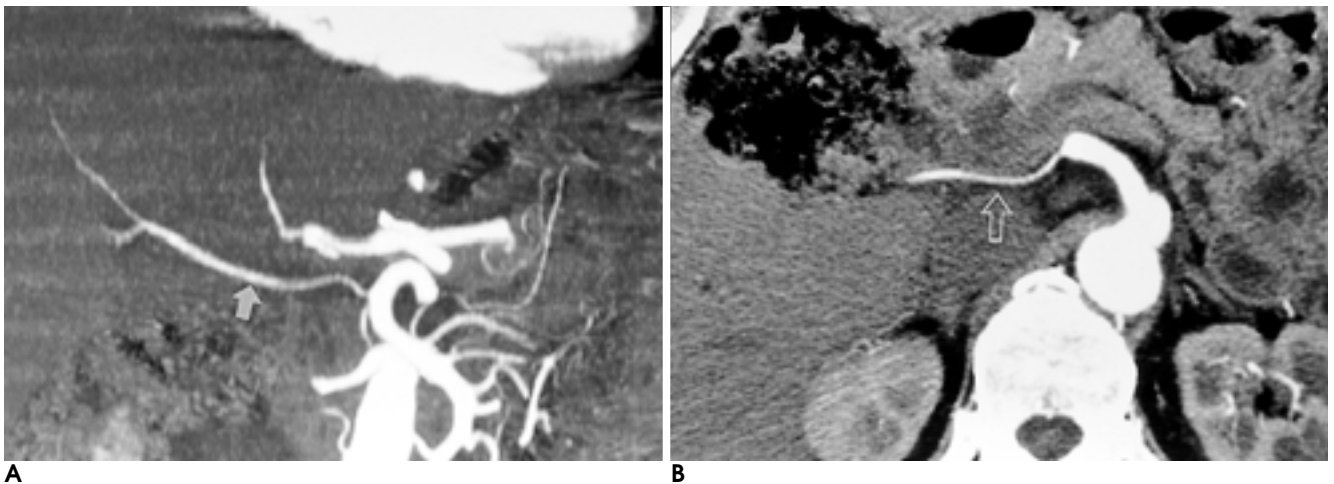


Fig. 1. Coronal oblique MIP image shows a replaced right hepatic artery (arrow) from superior mesenteric artery (A). Note the replaced right hepatic artery (open arrow) at porto-caval space on axial MIP image (B).

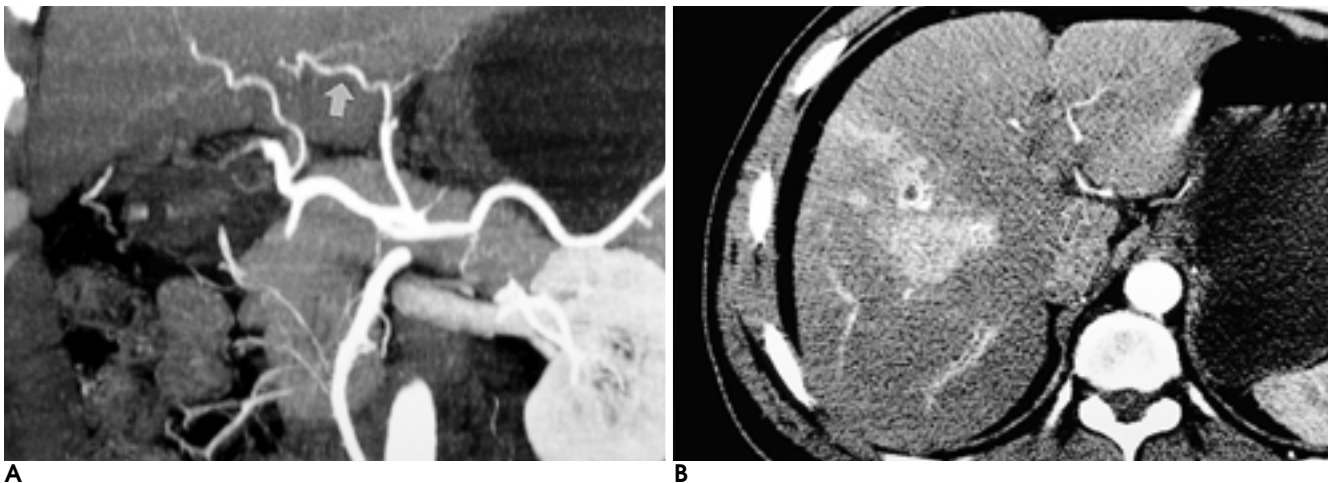


Fig. 2. Coronal oblique MIP image shows a replaced left hepatic artery (arrow) arising from left gastric artery (A). Axial MIP image shows a replaced left hepatic artery (open arrow) in the fissure of the ligamentum venosum (B).

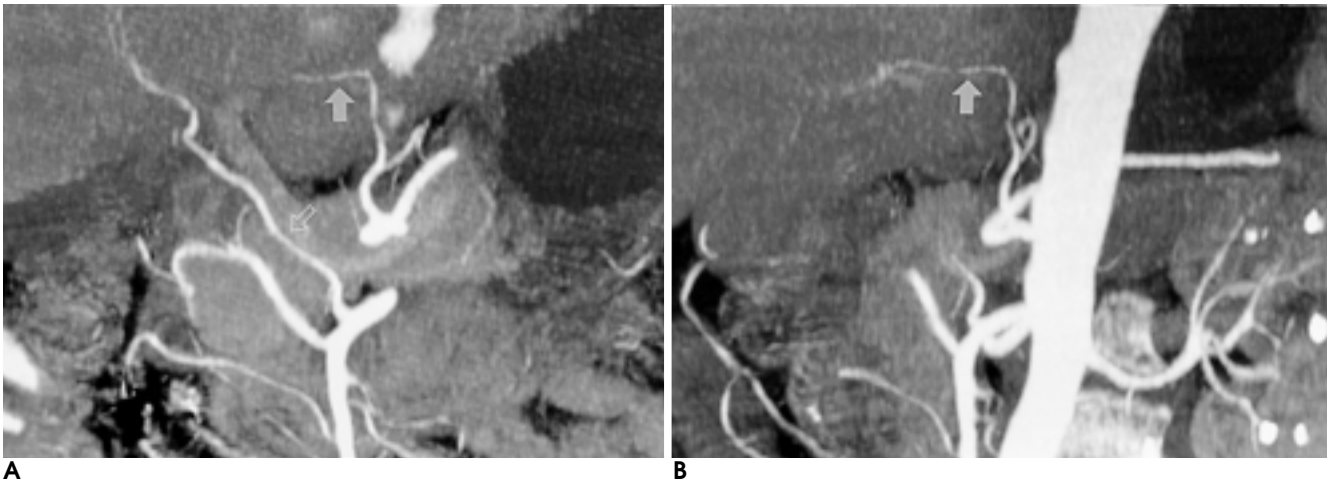


Fig. 3. Coronal(A) & sagittal(B) MIP images show a replaced left hepatic artery(arrow) arising from left gastric artery and a replaced right hepatic artery(open arrow) arising from superior mesenteric artery.



Fig. 4. The common hepatic artery, left gastric artery, and splenic artery have a replaced origin from the superior mesenteric artery on coronal(A) and oblique coronal(B) MIP images.



Fig. 5. Coronal MIP image shows a replaced right hepatic artery(arrow) arising from gastroduodenal artery(open arrow).

(15).

CT	가	CT
가	(abdominal vasculature)	가
Chambers (16)		가
CT		96%
CT 87%	가 (17)	
100%, 가	100%, 가	94%, 가
		99%

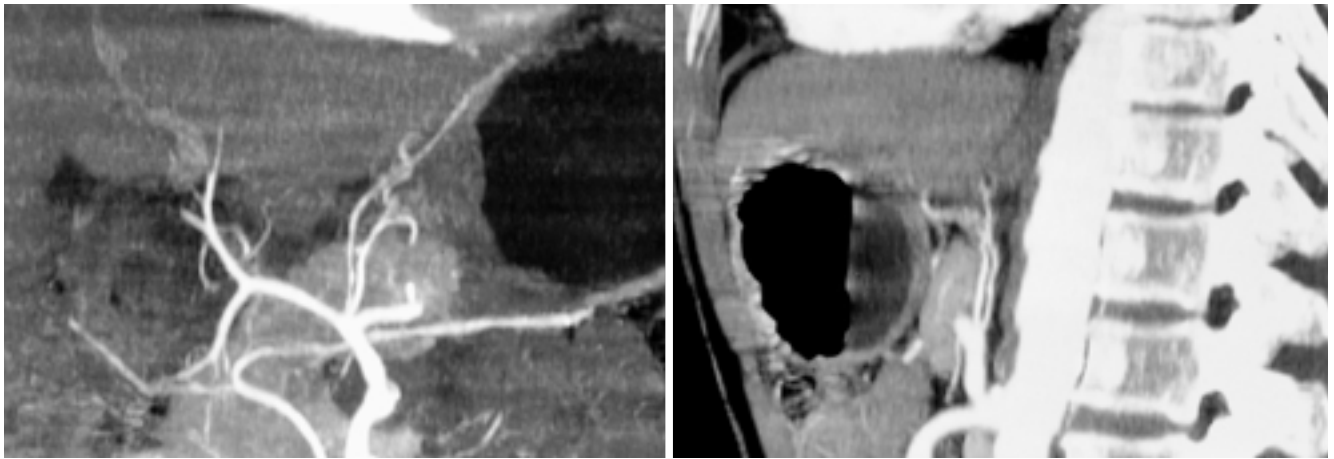


Fig. 6. The celiac trunk and the superior mesenteric artery have a same origin. And the other vessels are normal in course on coronal(A) & sagittal(B) MIP images.

88%, 100%, 100%, 98%
11 가 16, 2 가 CT 가 (3, 15).
Workstation 가
(pancreaticoduodenal arcade)
(morbidity) (mortality)
(20, 21).
Multidetector helical CT CT
pitch
(single bolus injection)
CT
(22 - 26). Four multidetector -
row helical CT single double mul-
tidetector row helical CT (volume cover-
age) . Section sensitivity profile
(image noise), (image artifact)
Hu (27) four multidetector - row
helical CT가 single multidetector - row helical CT
volume coverage
Volume coverage
speed가 2 - 3
speed가 2 - 3 가
2 - 3 가
(multiphase study)
가

11 가 14
2 , 1 CT
(replacement of the entire hepatic trunk),
(3, 16, 19). 가 가
CT 가 CT
CT 가 workstation
Winter (3)
shaded surface display(SSD)
maximum intensity projection(MIP) techniques
CT CT

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Assessment of Hepatic Arterial Variation Using Multidetector Helical CT-Angiography¹

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Purpose: To evaluate the anatomy of the hepatic artery and normal variants using oblique thick-slab maximal intensity projection (MIP) 3-D CT angiography and multidetector helical CT technology.

Materials and Methods: In 70 patients, axial three-phase CT together with multidetector helical CT and a non-ionic contrast agent was used to evaluate liver disease. During the early arterial phase, the parameters were as follow: slice thickness, 2.5 mm; table speed, 15 mm/rotation, pitch, 6; contrast material, 4 ml/sec; total 120 ml. Using the MIP technique and an Advantage window voxtral 3.03 system (GE), the images obtained were reconstructed as 3D angiograms. In each case, the arterial anatomy and its variants were recorded.

Results: A typical anatomy was found in 53 cases (75.7 %). Common variants were a left hepatic artery arising from the left gastric artery(8 cases, 11.4 %) and a right hepatic artery arising from the superior mesenteric artery(3 cases, 4.3 %). Other variant cases were a right hepatic artery arising from the gastroduodenal artery(2 cases, 2.9%), a proper hepatic artery arising from the left gastric artery (1 case, 1.4%), a hepatomesenteric trunk (1 case), a hepatogastric/splenoenteric trunk(1 case), and a celiomesenteric trunk (1 case).

Conclusion: 3-D hepatic angiography using multidetector helical CT technology is non-invasive and as accurate as conventional angiography for the evaluation of hepatic arterial anatomy. It is thus considered that 3-D CT angiography is very helpful for the evaluation of hepatic arterial anatomy prior to liver surgery such as transplantation or the treatment of hepatocellular carcinoma.

Index words : Liver, CT

Angiography

Computed tomography (CT), three-dimensional

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