

Incidental Findings in MRA for Mesenteric Ischemia: Impact on Utilization

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Objective: The purpose of this study is to characterize incidental findings (IF) identified after MR angiography (MRA) in patients with suspected mesenteric ischemia. Specifically, this study seeks to quantify IFs and categorize lesions with an impact on clinical management and downstream utilization of ancillary services.

Methods: Potential subjects who received an MRA were retrospectively identified using a computerized radiology information system database and manually searching for those patients whose clinical indication for the MRA was a clinical suspicion of mesenteric ischemia. All reports were reviewed in their entirety by a single investigator who catalogued IFs described either in the body of the report or impression. For the purpose of this study, an IF was defined, a priori, as any finding not related to the mesenteric vasculature. For each report in which an IF was noted, the same investigator reviewed all subsequent clinic notes, lab results, and imaging reports contained within patient's electronic medical record. The project was approved by the Institutional Review Board.

Results: Of the 236 consecutive patients who received MRA for chronic mesenteric ischemia were reviewed and 167 (71%) were found to contain at least one IF. The total number of IFs identified was 335. The range of IF included 62 instances of simple renal cysts, 17 instances of severe renal artery stenosis, 6 instances of mass suspicious for adenoma or carcinoma, and 60 other incidental findings (table 1). Of the 167 patients with at least one IF, 142 remained within our health-system following the initial report of the IF. Among these 142 patients, a total of 14 (10%) received follow-up imaging, lab tests, procedures, or therapy as a direct consequence of the IF identified on MRA. Although most follow-up consisted of a limited number of studies, a minority of patients underwent a more extensive work-up with multiple studies, biopsies, and hospital admissions. Taken together, there were a total of 79 follow-up studies in the 14 patients who received further care.

Table I. Summary of Incidental Findings by Organ System

Organ System (incidence)	Incidental Finding (incidence)		
Other (130)	atherosclerosis (48) arterial stenosis (29) pleural effusion (18) hiatal hernia (8) AAA (7) ascites (4)	cardiomegaly (3) graft stenosis (2) diaphragm eventration (2) atelectasis (2) pericardial effusion (1) abdominal wall mass (1)	hernia (1) distended bowel loops (1) narrowing of IVC (1) peri-aortic fluid collection (1) subcarinal mass (1)
Kidney (129)	cyst (62) mild-moderate RAS (37) severe RAS (17) extra-renal pelvis (4)	atrophy (2) slow arterial flow (2) horseshoe kidney (1) old infarction (1)	hydronephrosis (1) renal vein stenosis (1) heterogeneous mass (1)
Liver (34)	cyst or hemangioma (23) indeterminate (2) non-suppressed fat (1) focal fat (1)	hepatocellular dz (1) remote trauma (1) iron deposition (1) periportal edema (1)	cirrhosis (1) possible hepatitis (1) metastatic dz. (1)
Bone (15)	spinal degeneration (5) compression fx. (5)	hemangioma (2) metastasis vs. hemangioma (1)	metastasis vs primary tumor (1) metastasis (1)
Spleen (10)	cyst (3) splenomegaly (2) cyst vs. hemangioma (1)	possible granulomatous dz. (1) iron deposition (1)	Gamna-Gandy body (1) non-specific lesion (1)
Gallbladder (9)	gallstones/sludge (7)	dilation of CBD (2)	
Adrenal (5)	thickening (2) cyst (1)	"node" (1)	possible adenoma (1)
Pancreas (3)	enlarged head (1)	atrophy (1)	mass, possible neoplasm (1)

Conclusion: MR angiography in patients with suspected mesenteric ischemia resulted in an average of 1.4 incidental findings per study performed. The majority of the IFs warranted no further characterization, however, a small minority described potentially significant clinically occult disease. The economic impact of these IFs was the result of downstream utilization of ancillary services and as a whole represents a potentially significant increased expense to the health system. The frequency and magnitude of these expenses warrants further investigation to determine which patient and provider variables impact the pattern and cost of resource utilization.