Abstract. – We report the case of a 49-year-old man admitted to our Institute because he suffered acute abdominal pain induced by eating. Sonography don’t revealed pathological findings. Then underwent a multi-detector row computed tomography angiography (MDCTA) that revealed an intimal flap separating true and false lumens that was located 2 cm from the origin of the superior mesenteric artery (SMA) and with an extension of 8 cm. Since the dissection was limited without occlusion of the SMA and the mesenteric marginal artery served as a collateral vessel on the distal side of the SMA, the treatment has been conservative. Improved CT technology facilitates the diagnosis of superior mesenteric artery dissection. Prompt diagnosis and treatment result in the lowest mortality rate and minimize the prevalence of intestinal infarction. Only 107 cases (including the present case) of isolated spontaneous SMA dissection without associated aortic dissection were identified from the literature.

Key Words: SMA, MDCTA, Post-processing techniques.

Introduction

Isolated dissection of the main trunk of the superior mesenteric artery (SMA) without aortic involvement is a unusual condition and the involvement of the intestinal blood supply is a major cause of death. Sometimes this condition may resolve spontaneously but, usually, when dissection of SMA occurs the mortality rate is high. Therefore, it is important to make an early diagnosis. This case report, identified by using multi-detector row computed tomography angiography (MDCTA), was an unexpected finding because he presented lower pain without nausea and vomiting. Improved CT technology facilitates the diagnosis of the SMA dissection.

Case Report

A previously healthy 49-year-old man, without an history of hypertension, was admitted in our Department from the Section of Plastic Surgery with an acute onset of a lower abdominal pain occurred after the lunch 4 days before. He had smoked 1 packet of cigarettes daily for the previous 15 years. No history of trauma was present and no symptoms of vomiting, nausea or constipation. On admission he had fever (37.4 Celsius). Blood pressure was mildly elevated (142/88 mm Hg). Physical examination of the abdomen showed normal bowel sounds on auscultation; the abdomen was tender, without signs of peritoneal irritation. The laboratory tests showed an high C reactive protein value (4.2 mg/dl) and leukocitosis (16,700), but other data were within normal range. A vascular examination revealed normal pulses in the carotid, radial, femoral and pedal arteries. Chest and abdominal radiographs showed a normal distribution of the bowel gas and content, without an evidence of bowel distention or free peritoneal air. Then patient underwent an abdominal sonography that revealed no abnormal findings. After 2 days, MDCTA was performed by using a 16-detector row CT scanning. Axial images showed the presence of isolated dissection of SMA trunk beginning about 2 cm from its proximal origin and extending distally for 8 cm with the presence of intimal flap (Figure 1). Moreover, it was clearly evident that the true lumen (only 3 mm in diameter) was compressed by the false lu-
men (17 mm) with a SMA calibre of 20 mm (Figure 2). MDCTA data were also post-processed by using Volume Rendering and Maximum Intensity techniques (Figure 3) in order to have a better spatial depiction of the dissection. The branches of the SMA were normal.

Since the dissection was limited without occlusion of the SMA, vascular surgery was not performed. A portion of the true lumen of the dissected SMA was highly compressed by the false lumen. However, the mesenteric marginal artery served as a collateral vessel on the distal side of the SMA. Therefore, the treatment has been conservative. A vasodilator, prostaglandin E1, was administered continuously at a dose of 0.02 µg/kg/min for 4 days. The patient was allowed to take food for 6 days after prostaglandin E1 treatment and did not develop further abdominal angina.

A MDCTA scan 10 days later demonstrated the improvement of the narrowing of the true lumen and the patient was discharged 23 days after the admission. At the 3 months follow-up he continues to be in good condition.

**MDCTA Technique**

MDCTA was performed by using a 16-multi-detector-row CT system (Philips, Rotterdam, The Netherlands). Written consent to perform MDCTA was obtained from the patient after a discussion about the associated risks with con-
Contrast enhanced MDCTA and the potential benefits deriving from the examination. Patient was placed in the supine position and 100 mL of a contrast medium (Ultravist 370; Bayer, Berlin, Germany) were injected into a cubital vein, by using a power injector at a flow rate of 4 mL/s and an 18 gauge I.V. catheter. Bolus tracking technique was used to calculate the correct timing of the scanning. Dynamic monitoring scanning began 6 seconds after the beginning of the I.V. contrast injection. The trigger threshold inside the region of interest (ROI) was set at +80 HU above the baseline. The delay between each monitoring scan acquisition was 1 second. When the threshold was reached the patient was instructed not to breath and after an interval of 4 seconds the scan started in caudocranial direction. CT technical parameters included: matrix 512 × 512, field of view (FOV) 32 cm; mAs 230; kV 120.

Discussion

Spontaneous and isolated dissection of the main trunk of the SMA without aortic involvement is an uncommon condition. Only 107 cases (including our report) with an isolated spontaneous SMA dissection and without an associated aortic dissection were identified from the literature. The first report was described in 1947 by Bauersfeld who referred the case of a 87 years old female patient with a bowel infarction due to the dissection of SMA. Although the dissections of the peripheral arteries are rare, the SMA may be the vessel most frequently affected by a spontaneous dissection after the carotid artery.

The etiologic factors of SMA dissection include atherosclerosis, fibrodysplasia, trauma, and congenital connective tissue disorders. However, the definite cause is not known. Microscopic findings include the fragmentation of the elastic fibers, loss of smooth-muscle tissue, areas of cystic degeneration, and atheromatous changes in the arterial wall.

The clinical features of this disease are abdominal symptoms due to acute or chronic mesenteric ischemia, sometimes related to the meals intake. Clinically, acute abdominal pain, intestinal obstruction, and intestinal angina are due to a sudden ischemic change. A chronic abdominal pain or an asymptomatic course are sometimes noted. The mechanism of the acute symptoms is caused by a sudden compression of the true lumen due to the rapidly enlarging false lumen. Most patients with SMA dissection have an acute epigastric pain associated with nausea.
and vomiting. An early diagnosis is mandatory for the risk of death. In rapidly expanding cases, the thrombotic occlusion and the embolism are likely to occur in the distal SMA leading to acute intestinal ischemia or infarction of the peripheral branches of the SMA.

The dissection usually begins a few centimeters from the origin of the SMA. An intimal tear allows entry of blood into the outer media, which causes a longitudinal dissection along the laminar plane of the vessel. In the present case the dissection was located 2 cm from the origin. This data agrees with Solis et al. who reported that the dissection begins 1.5 to 3 cm from the origin of the SMA. This segment of the SMA corresponds to the exit of the artery from the pancreas.

In this case, the abdominal MDCTA was an useful diagnostic examination for detecting SMA dissection with mural thrombus. MDCTA has been proven to be as accurate as conventional arteriography and offers numerous advantages such as lower morbidity and mortality rates. The main advantage is the capability to show the luminal borders and extraluminal disease threedimensionally, thus providing additional data concerning other abdominal organs and so evaluating the potential coexistence of a bowel ischemia. Patient exposure to ionizing radiations, and the use of the contrast medium represent some minor limitations of this technique. In our patient MDCTA easily demonstrated the enlarged false lumen with thrombosis, and dorsal displacement of the true lumen. Moreover, MDCTA was useful for the three-dimensional assessment of the characteristic morphology and the correct relationship between the dissection and the branches of the SMA. Further, identified the existence of mesenteric collateral vessels that allowed to use in this case a medical approach.

An interesting point is that in our case the abdominal ultrasound did not revealed abnormal findings; this data agrees with the paper of Takayama et al, where the SMA artery dissection was not detected by sonography. Likely sonography is a low-sensitive method to detect SMA detection, because, usually, patients are suffering and with a low-grade of complaint so that the identification of a such complex condition (presence of flap) can be extremely difficult.

In our patient as the dissection was limited without occlusion of SMA, the vascular surgery was not performed and the abdominal symptoms subsided. Surgery is usually recommended for more extensive dissections because of the high risk of bowel necrosis. However, there aren’t currently established guidelines for isolated SMA dissection. Miyamoto et al reported that 24 out of 55 patients with spontaneous SMA dissection were treated conservatively. In fact, the obstruction of the main SMA trunk doesn’t always result in bowel infarction because of the existence of the mesenteric marginal artery. Therefore, surgical intervention may not be necessary unless complications such as intestinal infarction and abdominal angina occur.

References