CORRELATION BETWEEN MULTI-SLICE CT SIGNS OF ACUTE MESENTERIC VASCULAR INFARCTION AND STAGING AND PROGNOSIS OF INTESTINAL INFARCTION LESION

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ABSTRACT

To fully explore the correlation between various spiral CT signs of intestinal infarction caused by acute mesenteric thrombosis and lesion staging and prognosis in later period of infarction. The study performed multi-slice spiral CT detection on 2600 patients. All patients were diagnosed with acute mesenteric infarction and there were different levels of ischemic symptoms. Reasons for their ischemia were analyzed. Also, statistics software was applied to analyze the correlation between multi-slice CT signs and intestinal infarction lesion staging and prognosis. The results show an obvious correlation between multi-slice CT signs of patients with acute mesenteric vascular infarction and intestinal infarction lesion staging and prognosis. Multi-slice CT signs can clearly show staging of intestinal infarction lesions. Specifically, when a patient’s intestinal density is relatively high, the prognosis is good; when a patient’s intestine exhibits expansion, the prognosis is poor. Multi-slice spiral CT can effectively predict pathology of intestinal infarction and provide valuable information on disease staging and prognosis for treatment in the course of clinical care. Therefore, it is very useful to confirm disease stage with multi-slice CT signs.

Key words: Multi-Slice CT Signs, Intestinal Infarction, Acute Mesenteric Artery, Disease Staging; Correlation.

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Introduction

The mesenteric superior artery generally has an acute intersection with the abdominal aorta. The superior artery has early disengagement and thick lumen. Hence, mesenteric embolism in clinics mostly refers to superior arterial embolization. Intestinal infarction refers to a functional intestinal disorder. Over time, this disorder can cause obvious lesions in a patient’s intestinal system, and severe cases may cause corresponding pathological changes in the whole body. Therefore, timely definite diagnosis and inspection of the patient’s intestinal infarction is necessary in clinics. Through clinical research, Hu Pengzhi, Wang Wei et al. found that multi-slice CT signs can more intuitively and clearly demonstrate disease stage of intestinal obstruction, which has important guiding significance for reasonable prognosis of patients(1).

Relevant clinical studies show that multi-slice CT signs can more clearly show the type of vascular thrombosis and provide a scientific basis for development of corresponding treatment programs. In order to improve intestinal infarction disease and provide patients with more favorable treatment services, through analysis of multi-slice spiral CT test results of 2600 cases of patients, the author has further confirmed a correlation between multi-slice CT signs of acute mesenteric infarction and intestinal infarction staging and prognosis, with specific circumstances reported below.

Method

General information

This study included 2600 patients diagnosed and treated in different hospitals from January 2012 to August 2015, including 1420 cases of vein occlu-
sion, 1,180 cases of artery occlusion, 1,532 male patients, 1,068 female patients. The oldest patient was 87 years old, while the youngest was 32 years old, with average age 57.3 ± 7.4 years.

**Multi-Slice CT detection method**

The study performed 64-slice CT scans for image detection. First, full abdominal CT scan of patients, arterial phase image acquisition delays 18-25 seconds, portal image acquisition delays 30-40 seconds, vein image acquisition delays 50-60 seconds, delay image acquisition delays 120-180 seconds.

**Image analysis method**

To ensure accurate evaluation of image results, all 2600 images obtained in the course of this study were studied and explained by professional image analysis personnel of various hospitals. Concrete results of multi-slice CT signs are demonstrated in the following areas:

- Intestinal wall enhancement, specifically demonstrated as persistent enhanced performance of patient intestinal wall or weakened intestinal wall enhancement;
- Intestinal wall thickening, specifically demonstrated as thickness of patient expanding intestinal canal increased by 1cm or more;
- Intestinal canal expansion, specifically demonstrated as small intestine diameter over 2.5cm or more, large intestinal canal diameter exceeding 8cm;
- Stercoroma, with feces in small intestinal canal;
- Part pneumatosis intestinalis, demonstrated as presence of gas in patient small intestinal canal with significant effect. Specific multi-slice CT sign results are shown in Figures 1 to 4.

**Figure 1:** Surgically cured adhesive SBO.  
*Note: (a) female, 25 years old, complete trap of intestinal wall in transition zone can be seen; (b) male, 58 years old, muddy mesenteric can be seen; (c) female, 81 years old, reduced intestinal wall strengthening and ascites can be seen.*

**Figure 2:** Male, 39 years old, small intestine internal hernia treated by surgery.  
*Note: mesenteric venous congestion thickening (long arrow), and decreased arteriovenous strengthening (short arrow) can be seen.*

**Figure 3:** Female, 56 years old, small intestinal volvulus treated by surgery.  
*Note: MIP image shows superior mesenteric vein distortion (long arrow) and distal venous congestion thickening (short arrow).*

The study adopted venous enhancement for observation and analysis of gas, ascites and other phenomena in patient mesenteric vessel or portal vein system, analyzed reasons for patient angiemaphraxis intestinal ischemia based on this, and then judges patient disease staging.

**Statistical method**

The research adopted SPSS19.0 statistical software for specific data analysis and establishment, with the form of n,% to denote count data, and applied X2 for inspection. P <0.05 showed statistical difference.

**Results**

The results are that multi-slice CT can clearly show specific causes for patient intestinal infarction. The study shows that 71 out of the 1420 patients with venous occlusion died, indicating a mortality rate of 5%. In
contrast, 1032 out of 1180 artery occlusion patients died, with mortality rate as high as 87.45%. The difference between groups was P <0.05, demonstrating obvious statistical significance.

Meanwhile, multi-slice sign results show a relatively high probability of intestinal dilatation, pneumatosis intestinalis, mesenteric pneumatosis, portal pneumatosis among patients with arterial embolization, while a relatively high probability of intestinal wall thickening and intestinal dilatation among patients with venous thrombosis.

Discussion

Prognosis of intestinal obstruction is closely related to reason and type of obstruction, whose specific effect is inseparable from timing of disease diagnosis and treatment. Under normal circumstances, if a patient has simple intestinal obstruction without severe systemic poisoning symptoms, the operative prognosis is usually good. However, if the patient has intestinal necrosis, the therapeutic effect will be closely related to specific length and scope of necrotic bowel. Under normal circumstances, in the case of timely rescue, the prognosis will develop in a positive direction. However, if too much intestine is removed, it will be difficult to maintain normal intestinal function, causing nutrient malabsorption and resulting in a poor prognosis. Advanced stage of the disease is usually manifested as high fever, shortness of breath, lowered blood pressure, faster pulse and other symptoms in clinics. Abdominal signs may show visible peristalsis, peristaltic waves, abdominal tenderness, with rebound tenderness and muscle tension after strangulation.

Mechanical intestinal obstruction may appear with hyperactive bowel sounds and air over water tone; intestinal strangulation obstruction has diminished or no bowel sounds. Therefore, in clinical treatment of this type of obstruction, doctors usually require patients with adhesive intestinal obstruction to pay attention to diet during remission. No stiff, cold food should be eaten, with diet mainly as dilute pap.

For roundworm intestinal obstruction, deworming treatment should be performed after relief. In addition to deworming drugs, oxygen therapy can be adopted to get rid of intestinal roundworm. Patients shouldn’t do strenuous exercise after satiation to prevent occurrence of volvulus.

Nevertheless, intestinal obstruction still has a very high mortality rate. Even if rehabilitated, patients will also suffer great pain. Therefore, it is essential to grasp the appropriate treatment opportunity. With gradual increase in application frequency of 64-slice spiral CT in clinics, recent years have seen comprehensive improvement in efficiency of diagnosis and treatment of intestinal obstruction, especially now when 320 slice has been developed in multi-slice spiral CT. As can be seen, CT scanning has entered the era of volume CT, which means a CT scan image can be rebuilt at any level without interval, with the image more clearly and realistically reflecting changes in anatomical structure and even very early pathological changes.

Therefore, to take full advantage of new technologies and new features of the new CT plays a significant role in guidance of clinical diagnosis and treatment. Clinicians need to understand the enhanced CT scanning capabilities, including the following aspects:

- Increased detection rate of focus, especially small focus;
- Improved qualitative ability for focus. 3. For those determined to be malignant, enhanced scanning can improve accuracy of tumor staging, or determine the possibility of surgical resection of tumor;
- Enhanced scanning is very important for identification of vascular and non-vascular diseases;
- 64 slice CT revascularization imaging is comparable to cerebral angiography (DSA), whose diagnosis of long-segment macroangiopathy, trunk branch lesions is superior to DSA, diagnosis agreement rate with DSA at 99%. Sometimes clinicians
are not satisfied with enhanced CT inspection results, considering that enhanced scanning fails to achieve their desired goals. But when image diagnosis doctors and technicians check application forms, it is often found that clinicians only specify enhanced scanning without requiring concrete enhanced contents.

Therefore, when clinicians have special requirements they should communicate with imaging department physicians to ensure accuracy of inspections. Application of 64-slice CT and above enables new CT features to expand continuously. If clinicians can grasp new CT technology, early detection of lesion or clear diagnosis is possible, which is beneficial for disease diagnosis and treatment. For acute abdominal diseases such as intestinal obstruction and abdominal organ trauma, with CT scanning and enhanced MPR, CTA technology, causes of intestinal obstruction, such as intestinal obstruction caused by neoplasm or obstruction of vascular supply origin, can be found. Moreover, site of abdominal organ trauma, whether there is active bleeding and severity of vascular injury can be found.

In summary, multi-slice CT scanning is effective for diagnosing causes of intestinal infarction, which is significant for staging and prognosis of the disease, and thus is worth promoting in clinics.

References


