รายงานผู้ป่วย

Mycotic aneurysm of the abdominal aorta: value of helical CT

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A large and bi-lobed saccular of bacterial antitis of the abdominal aorta in a 61 year-old man was detected by Helical CT. The ability of helical CT to perform CT angiograms (CTA) is substantially beneficial in identification and characterization of infected aneurysms. Evaluation of the extension of the aneurysm and its involvement with major arterial branches are particularly productive. Helical CT with CTA application has a high potential to replace conventional angiograms for diagnosis of mycotic aneurysms of the abdominal aorta.

Key words : *Bacterial antitis of abdominal aorta, Value of helical CT.*

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สิทธิพร ศศิวรรณพงศ์, ลินดา พานธงรักษ์-บราวน์. บทบาทของ Helical CT ในการวินิจฉัย Mycotic aneurysm ของเส้นเลือดแดงใหญ่ในท้อง. จุฬาลงกรณ์เวชสาร 2541 พ.ค; 42(5): 367-72

บทความนี้เป็นการรายงานผู้ป่วย 1 ราย ที่เป็น Salmonella infection of the atherosclerotic abdominal aorta. การวินิจฉัยโดยการใช้เครื่อง Helical CT scan สามารถวินิจฉัยและเห็น ขอบเขตของก้อน Aneurysm และเส้นเลือดข้างเคียง ซึ่งเป็นประโยชน์ในการวางแผนก่อนการผ่าตัดและเป็นการแทนที่การใช้ วิธีตรวจโดยวิธี Angiogram.

A mycotic or infected aneurysm of the abdominal aorta is an uncommon disease. It is a life-threatening disorder with a mortality rate as high as 50% [1]. Diagnosis of an aortic mycotic aneurysm has traditionally been made with angiography. [2,3] However, the angiogram is a relatively invasive procedure and requires direct assessment of the arterial system which potentially can increase the morbidity and mortality of the patient. CT scan is becoming a popular imaging modality for diagnosis of mycotic aortic aneurysms because it can be performed immediately without much patient preparation and is noninvasive. However, the conventional CT scan lacks the ability to perform good quality three-dimensional (3-D) reformations. Therefore, many patients will end up having an angiogram as a confirmatory procedure after the CT.

Helical CT is the most up-to-date, state-of-the-art technology for CT scans. It has the ability to perform multiple transaxial images from a single breath hold, allowing 2-D and 3-D reformations to be generated with a maximum degree of longitudinal resolution which will optimize the image quality.[4] CT angiogram (CTA) benefits the most from these multiplanar and 3-D imaging capabilities of helical CT. Here in we report a case of mycotic aortic aneurysm diagnosed by helical CT in order to emphasize its optimal CTA role which can obviate the invasive angiographic procedure.

Case report

A 61-year-old man presented with abdominal pain and fever for five days. Physical examination showed marked tenderness of the mid-abdomen and abdominal bruit was heard. Laboratory findings showed leukocytosis (WBC= 10,800 cells/mm^3 with 85% neutrophils). Because of the abdominal bruit, Doppler ultrasound was performed, showing an aneurysm of the abdominal aorta measuring about 6x3.8 cm in size. The top of the aneurysm was below the SMA but its inferior extension could not be well demonstrated. Both renal arteries were not well visualized by the ultrasound. A helical CT scan (Somatom plus 4, Siemens) of the abdominal aorta was then performed in order to better delineate the extension of the lesion. A CT angiogram (CTA) with multiplanar transaxial images with 2-Dand 3-D reformations was performed. The findings revealed a bi-lobed saccular aneurysm originating from just below the SMA origin and extending inferior to the renal arteries origin. The bi-lobed saccular aneurysm showed an irregular surface and measured about 5x6x7 cm. in size, of which the upper lobe was slightly larger than the lower lobe (figure 1).

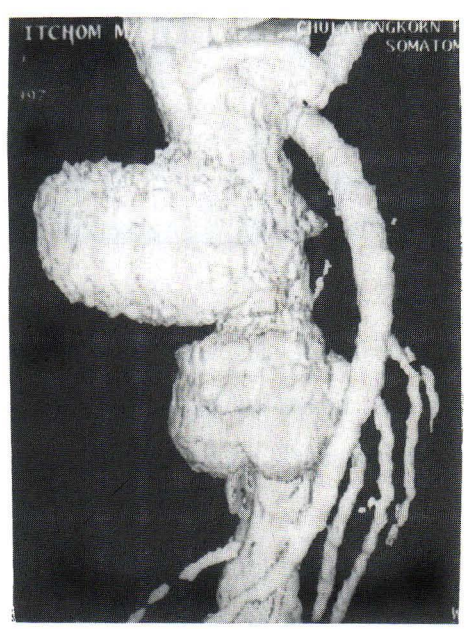

Figure 1. 3-D reformation of CTA show a large bi-lobed saccular aneurysm.

The saccular aneurysm projected towards the right side of the abdominal aorta, compressing the right renal vessels causing delayed excretory functions of the right kidney (figure 2, 3). The left renal vessels

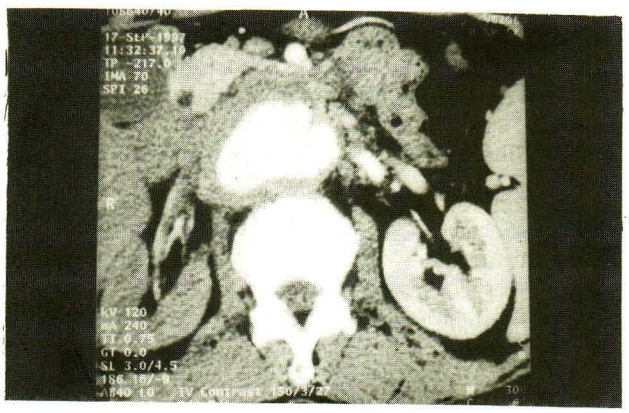

Figure 2. Axial CT in carly arterial phase, aneurysm projected towards the right side, compressing the right renal vessels with delyed

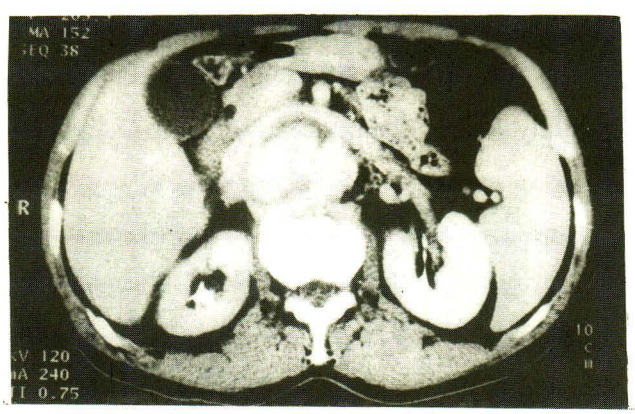

Figure 3. Axial CT in venous phase shows delayed excretion of kidney. Surrounding soft tissue enhancement, represents inflammation.

were intact and the left kidney functioned well. Evidence of abnormal soft tissue density around the aneurysm was seen, representing leakage of the aneurysm and a surrounding inflammation (figure 4). Based on the information from the CTA, surgery was performed

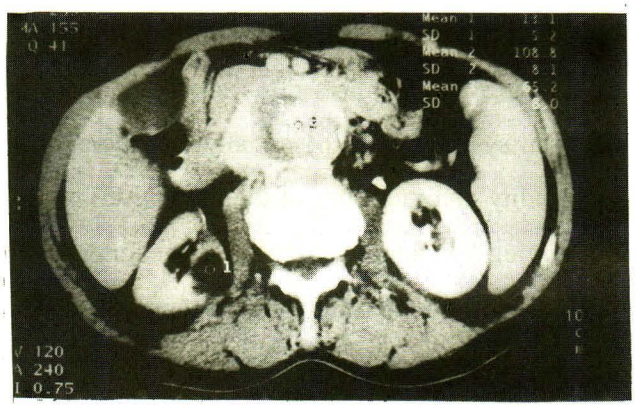

Figure 4. Evidence of abnormal soft tissue density around the aneurysm, represets inflammation and leakage of the aneurysm. Cortical cystic is also seen at right kidney.

At surgery, a large bi-lobed saccular aneurysm with surrounding inflammation was found just below the SMA and extending below the origin of the renal arteries. This corresponded with the CTA findings. The right renal artery was compressed by the aneurysm. The aneurysm was resected and a graft prosthesis was done using straight graft knitted Dacron with a gelatinous coat. No reimplant renal arteries were done because no involvement of renal arteries were seen. There was only compressed right renal artery. Pathological findings revealed atherosclerosis of the resected vessel with evidence of acute and chronic inflammation of the surrounding soft tissues. Three specimens of hemoculture were all positive for Samonella group D. The culture of

the resected aneurysmal tissue was negative, presumably due to extensive antibiotic treatement before surgery. Post operatively, the patient recovered very well and was eventually discharged.

Dicussion

Bacterial antitis of the aorta are uncommon vascular lesions. They can arise in normal or atherosclerotic aorta caused by hematogenous seeding. Gram-positive cocci are commonly isolated but Gram-negative organisms, especially *Salmonella spp.*, are also found. However, culture of the resected aneurysm may be negative due to extensive preoperative antibiotic treatment. [3] This happened in our case. However, in our case, hemoculture was positive for *Salmonella* group D, confirming the diagnosis of mycotic aneurysm. The incidence of rupture varies from 10% in patients with Gram-positive infection to 84% in those with Gram-negative ones. [5] The present case also showed evidence of aneurysmal leakage, corresponding to a previously reported high incidence of rupture in gram-negative infections.

Previously, the imaging diagnosis of a mycotic aneurysm was provided by ultrasound, conventional CT and conventional angiography. Ultrasound is reliable in detecting and sizing aneurysms, although there is a tendency to underestimate the size as compared to surgical findings. [6] Ultrasound is also poor at evaluating involvement of renal arteries, the proximal aneurysmal neck and inflammatory changes. [6] Technical problems, such as overlying bowel gas, may interfere with ultrasound examinations. In our case, even with doppler technique, ultrasound was still not able to show the full extent of the aneurysm, the bi-lobed appearance nor the outline of the renal vessels.

Conventional CT scans have been widely used for diagnosis of mycotic aneurysms. However, the problems of misregristration artifacts, motion artifacts and the inability to produce good quality 3-D images limit the value of conventional CT in ful delineation of the aneurysmal extent. Most patients usually end up having an angiogram to depict the extension of the aneurysm before surgery. However, an angiogram requires time and the procedure is quite invasive, which may adversely affect the probability of survival.

Helical CT with CTA application is promising as "one-stop-shopping" imaging of choice for diagnosis of an abdominal aortic aneurysm. Its high speed of acquisition enables the entire abdomen and pelvis to be imaged in less than two minutes and [7] minimizing motion and respiratory misregistration artifacts. Multiple three–dimensional displays are optimal for delineation of the aneurysmal size and extent. Major arterial branches are readily assessed by CTA. The information received from CTA is usually useful and adequate for surgical planning. As shown in the present case, the bi-lobed and saccular appearance , the size and extension, as well as compression of the right renal vessels by the mycotic aneurysm, and evidence of aneurysmal leakage, were all well demonstrated by helical CTA. In this case, the necessary imaging

information received from the helical CTA was adequate for surgeons to proceed to surgery and obviated the need for angiographic study.

Summary

In cases of abdominal aortic mycotic aneurysm, helical CT imaging will give surgeons adequate and useful information in a single, non-invasive, rapid, and relatively inexpensive procedure which is adequate for pre-operative planning, and it can replace the more invasive conventional angiography in most cases.

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