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Real-time and duplex ultrasonography in diagnosis of mycotic aneurysm of the abdominal aorta: a case report.

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Chayutipraiwan U, Vajarapongse K. Real - time and duplex ultrasonography in diagnosis of mycotic aneurysm of the abdominal aorta : a case report Chula Med J 1990 Nov;34(11) : 873-879

The case of a 55 year old diabetic female with mycotic aneurysm of the abdominal aorta is presented. Real-time ultrasonography could identify the mycotic aneurysm and the site of communication with the aortic lumen. Irregular opening of the aortic wall defect raised the possibility of mycotic aneurysm in contrast to the smooth edged opening of a noninfected saccular aneurysm. Duplex ultrasonography also demonstrates blood flow through the aortic wall defect and in the aneurysm.

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อุไรวรรณ ขยติไพรวลัย, เกษร วัชรพงศ์. ไมโคติคแอนนิริสซึมของแอ็บคอมมินัลเออร์ต้า วินิจฉัย
โดยอัลตราซาวด์ : รายงานผู้ป่วย จุฬาลงกรณ์เวชสาร 2533 พฤศจิกายน; 34(11) : 873-879

รายงานเสนอการตรวจพบ *mycotic aneurysm* ของ *abdominal aorta* ในผู้ป่วยหญิงอายุ 55 ปี โดยใช้
อัลตราซาวด์ ซึ่งสามารถบอกตำแหน่งและลักษณะของ *aneurysm* ได้ ตรวจพบว่า รูเปิดจาก *aorta* เข้าสู่ *aneurysm*
มีขอบเขตไม่เรียบ ซึ่งลักษณะดังกล่าวจะช่วยวินิจฉัยแยกโรค จาก *aneurysm* ที่ไม่มีการติดเชื้อ อุเพ็ญอัลตราซาวด์
ยังสามารถบอกลักษณะของการไหลของเลือด ใน *aorta* ผ่านรูเปิดเข้าสู่ *aneurysm* ซึ่งช่วยในการวินิจฉัยเป็นอย่างมาก

Mycotic aneurysms of the abdominal aorta are a rare but potentially lethal problem.^(1,2) The mortality rate is high if the diagnosis is delayed due to rapid progression of the aneurysm⁽³⁾ and fatal rupture.^(1,4,5) The suggestive clinical presentations are fever, abdominal or back pain, in association with a pulsatile abdominal mass.⁽⁵⁻⁸⁾ However, detection of mycotic aneurysms has been dependent on a strong clinical suspicion and arteriography.^(1,9)

In recent years, new developments in imaging techniques such as ultrasonography⁽¹⁰⁻¹²⁾ and computed tomography^(13,14) allow for earlier diagnosis which is of value because an aggressive therapeutic approach should permit a better survival rate.^(7,15-17)

Doppler US can determine the presence and direction of blood flow in a vessel. This is based upon the Doppler principle which state that when an incident sound wave strikes a moving target (ie the RBC in a blood vessel) the frequency of the reflective sound wave is changed. This change in frequency determines the doppler shift and is measured in kHz. This Doppler shift can be displayed as an audible signal or as a waveform. The waveform displays the amplitude of the Doppler shift (kHz). A waveform above the baseline (positive Doppler shift) denotes blood flowing towards the Doppler US beam while those below the baseline indicate blood flow away from the beam.

We report a case of mycotic aneurysm of the abdominal aorta detected by real-time ultrasonography

and a doppler study. The diagnosis was confirmed by aortography.

CASE REPORT

A 55-year-old diabetic female presented with a 2-month history of progressively enlarged abdominal mass, anorexia and weight loss. On physical examination, she had a heart rate of 110 beats per minute, a blood pressure of 120/80 mmHg and a body temperature of 39°C. A pulsatile mass of about 5×5 cm. was found in mid abdominal region. On admission, the WBC was 20,400/ul with 89% polys. Real-time ultrasonography demonstrated a large abdominal aortic aneurysm in the mid abdominal region. The uppermost and lower most portions of the aneurysm were obscured by intestinal gas, so the definite relationship of the aneurysm to the renal and iliac arteries could not be determined. A double lumen appearance of the aneurysm was seen (Fig.1), suggesting the diagnosis of a dissecting aneurysm. An aortic wall defect was noted at the proximal portion of the aneurysm and the edge of the defect was irregular. Duplex ultrasonography showed high pressure arterial flow in both lumens but flow in the narrow anterior lumen was more obvious (Fig.2) Study of the blood flow through the aortic wall defect, between the two lumens, revealed turbulent flow into the large posterior space (Fig.3). Aortography demonstrated a lobulated eccentric saccular aneurysm arising from the posterior aspect of the infrarenal abdominal aorta causing anterior displacement and marked compression of the adjacent aorta (Fig.4).

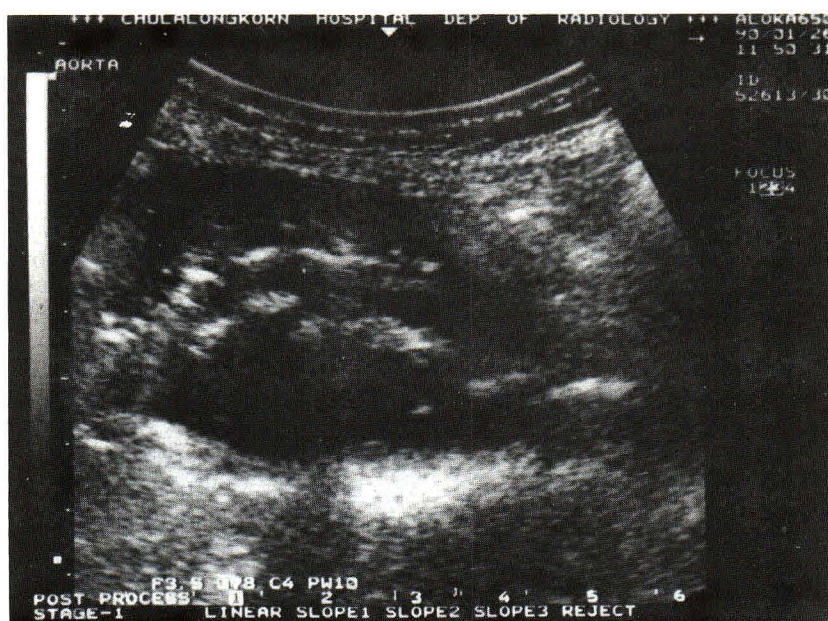


Figure 1. Sagittal image of the infrarenal aorta showing a large aortic aneurysm with double lumens. The aortic wall defect at proximal portion of the lesion showing irregular edge.

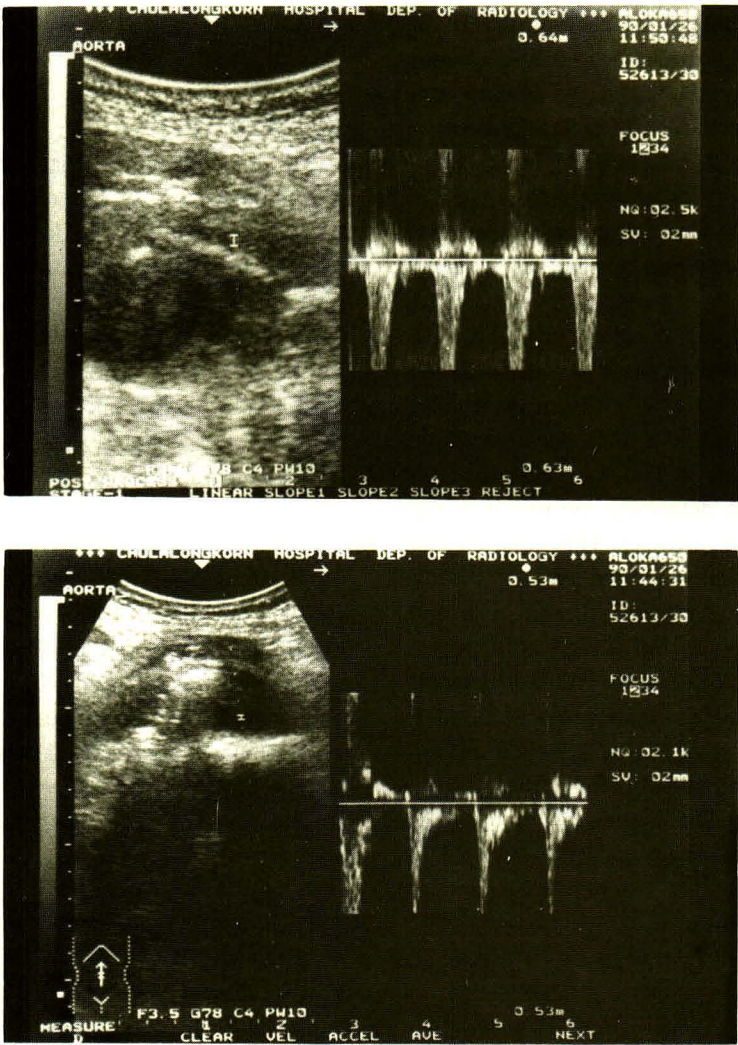


Figure 2. A. Doppler study of the anterior narrow lumen showing high arterial flow.
B. Doppler study of the large posterior space also demonstrating high, but less, arterial flow in the same direction as (A).

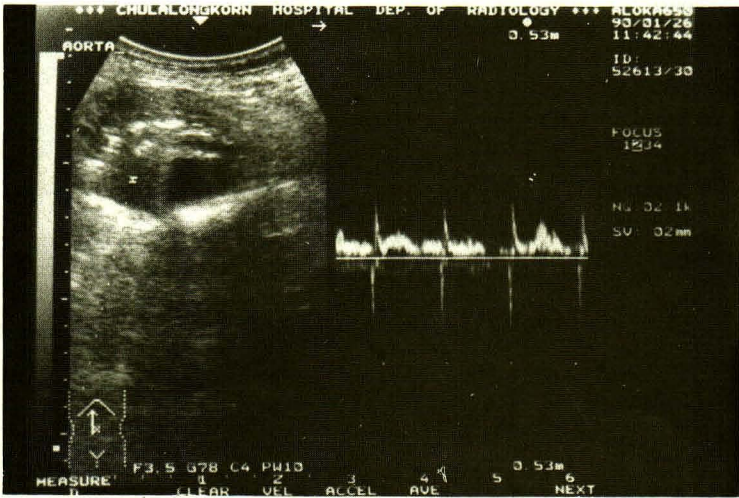


Figure 3. Doppler study near the aortic wall defect showing turbulent flow from the anterior lumen into the posterior space.

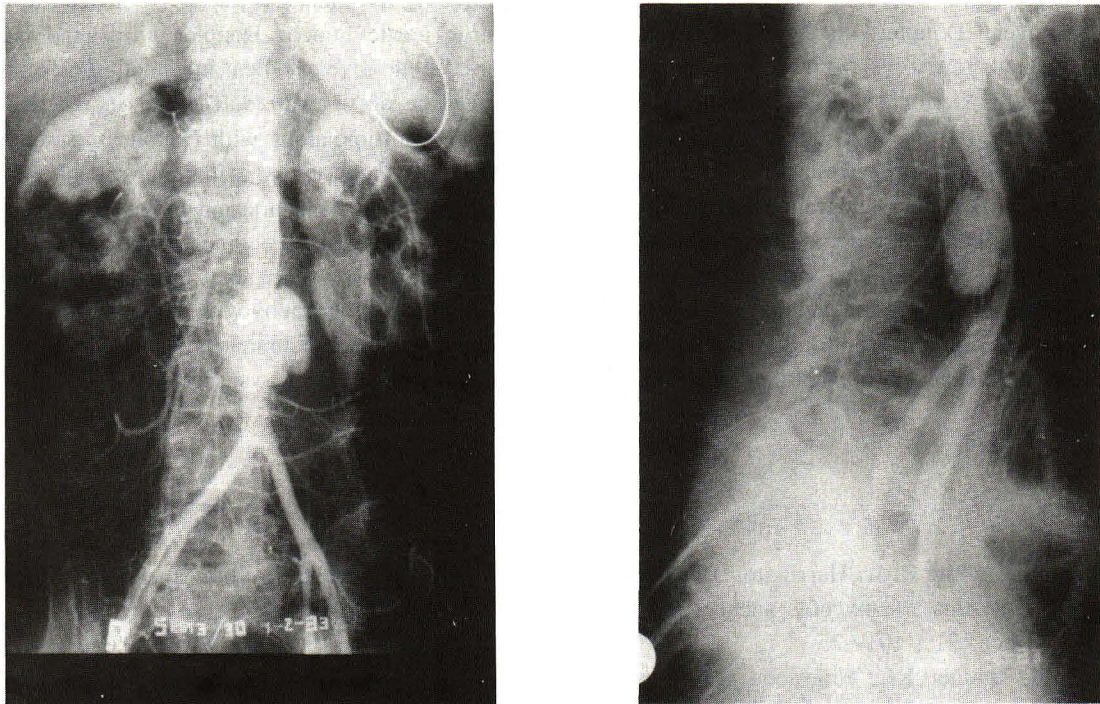


Figure 4. Abdominal aortogram showing a saccular aneurysm at posterior aspect of the infrarenal aorta. Note the lobulated outline of the aneurysm and pressure effect upon the adjacent aortic lumen.
(A) AP view (B) Lateral view

At laparotomy, an infrarenal aortic aneurysm was found with evidence of acute inflammation and abscess. Debridement and drainage of the infected area were performed. A definite axillo-femoral bypass graft was done 17 days later after high dose antibiotics were given and the general condition of the patient was improved. Cultures from the abscess grew *Klebsiella* species. The patient became afebrile and was discharged on the 40th day post operation.

DISCUSSION

Mycotic aortic aneurysm comprise 2.6% of aortic aneurysms.⁽¹⁸⁾ Pre-existing diseases or defects of the aorta such as atherosclerosis, cystic medionecrosis, congenital anomalies and trauma favor bacterial lodgement on the aortic wall.^(5,15,18-20) However, normal arterial intima may be invaded by the organisms especially in case of salmonella bacteremia.⁽¹⁵⁾ The sources of infection include septic embolization from bacterial endocarditis, septicemia with lodgement of bacteria in the vasa vasorum, contiguous infective processes or inoculation of bacteria at time of arterial trauma.^(4,5,15,20) The patients may have associated depressed immunocompetence such as diabetes mellitus, alcoholism, collagen diseases, administration of corticosteroid or cytotoxic agents and malignant neoplasms.^(1,7,15)

Prior to 1945, most mycotic aneurysms were secondary to SBE and the thoracic aorta was most commonly involved.^(18,21) The advanced of antibiotics has profuced a decreased incidence and a more rapid cure of endocarditis but have led to a shift of pathogens to those that are relatively antibiotics resistant ie. *Salmonella* and *Staphylococcus*. The location of these mycotic aneurysms has shifted from the thoracic to the abdominal aorta.^(1,2,7,21,22) Most of the aneurysms are sacciform

and may be either true or false aneurysms.^(1,7,9,16,23) The angiographic features are diagnostic, but not characteristic and must be differentiated from syphilitic, atherosclerotic, traumatic and congenital aneurysms.⁽¹⁶⁾ Nevertheless, pathological findings in a recent report by Chan et al⁽⁷⁾ stated that the openings into the mycotic aneurysms are usually irregular or ragged in contrast to the smooth, oval edges noted in patients with saccular aneurysms of a noninfectious origin. Therefore, imagings that permit visualization of the openings of the aneurysms may help to distinguish these conditions. Recent reports of the ultrasonographic study of mycotic aneurysms clearly indentified the saccular appearance of the aneurysms and also the sites of communication with the aortic lumen.⁽¹⁰⁻¹²⁾ However, there has been no previous report of the sonographic appearance of the openings into the

mycotic aneurysms.

However, Doppler ultrasound revealed the direction of blood flow to be from the narrow anterior lumen into the posterior space and along with the appearance of the aortic wall defect, suggested the diagnosis of a mycotic aneurysm.

The Real-time ultrasonogram of our case, unlike previous reports, could not demonstrate the saccular appearance of the aneurysm very well due to posterior extension causing compression and narrowing of the aneurysm between the spines and the true aortic lumen. The superior and inferior portions of the aneurysm were

obscured by intestinal gas making it difficult to identify the true aortic lumen. Doppler ultrasound has been reported⁽¹²⁾ to give excellent information on blood flow through the aortic wall defect and in the aneurysm.

Real-time along with Doppler ultrasonography is a painless, noninvasive technique, capable of rapidly imaging the abdominal aorta and giving accurate information on the size and appearance of the aorta along with determining the presence and direction of blood flow. Real-time ultrasonography with doppler study should be the initial screening technique when a mycotic aneurysm of the abdominal aorta is suspected.

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