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**Abdominal aortic aneurysm in pregnant crack cocaine abuse patient**

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**Abstract**

*Back ground:* Rupture is a fatal complication of abdominal aortic aneurysm. An aneurysm is defined as ruptured when bleeding is present outside of the wall of the aneurysm.

AAA is usually the result of degeneration in the media of the arterial wall, resulting in a slow dilatation of the lumen of the vessel. AAA is usually asymptomatic until they expand or rupture. Whether aortic rupture is due to AAA can only be ascertained through aortic imaging.

Patients at risk for AAA are those who are male, old, have atherosclerotic vascular disease, collagen vascular disease or mycotic aneurysm. Chronic inflammations play an important role on AAA formation. Recently identified risk factor for aortic aneurysm in the pregnant woman is the use of crack cocaine. AAA is very rare in young females Crack cocaine users and pregnant woman are at increased risk of suffering from AAA. Cardiovascular complications related with cocaine abuse are adrenergic mediated, vasoconstriction, Include myocardial ischemia, infarction, myocarditis, thrombosis and aortic dissection.

*Case presentation:* A 32 year old woman crack user, in 40 weeks pregnancy came to labor department. An emergency cesarean section was performed. She expired 13 hours after surgery. Autopsy detects dissection of abdominal aortic aneurysm.

*Conclusion:* Sympathetic agonist and vasoconstriction effect of crack resulting increased blood pressure, heart rate, myocardial contractility would increase the risk of aortic dissection.

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**Keywords:** abdominal; aortic aneurysm; crack cocaine; pregnancy

### **Introduction**

In 1760 Dr Nicholls, physician to King George first described on necropsy an aortic dissection (1). Abdominal aortic aneurysm is a limited dilatation of the part of abdominal aorta just below the renal arteries and end above the iliac arteries. May be long up to 25 cm (2). The most common cause for degenerative process is atherosclerosis (3). Chief among risk factors is hypertension (3). Other causes include hereditary connective tissue disorders, aortic arthritis, chest trauma, bicuspid aortic valve (3). Possible other aortic disorders such as giant cell arthritis or systemic lupus also may predispose to dissection. AAA is very rare in young females. Crack cocaine users and pregnant woman are at increased risk of suffering from AAA (4).

In woman < 40 years ago, % 50 of aortic dissection occur during pregnancy (5). The cardiovascular complications related with

cocaine abuse are adrenergic mediated, vasoconstriction, Include myocardial ischemia, infarction, myocarditis, thrombosis and aortic dissection (6).

Cocaine decreases uterine blood flow and induces uterine contractions. It is clear, however, that women who use cocaine during pregnancy are at significant risk for shorter gestations, preterm labor, spontaneous abortions, PROM, abruption placenta, and death (7).

Cocaine crosses the human placenta and is associated with free radical production, and fetal encephalopathy. Cocaine has teratogenic or adverse effects on developing brain (7).

In this report we present the case of a crack user pregnant woman who develops an aortic aneurysm.

The vasoconstriction and sympathomimetic effect of crack, coupled with cardiovascular

changing during pregnancy, may predispose the patient to aortic aneurysm.

### **Case study**

A 32 year old woman who was 40 weeks pregnant with her second pregnancy came to the labor department complaining of labor pain and rupture of membrane.

She had a previous cesarean section last year. She abused crack cocaine. She used crack every 2 hours.

She did not receive adequate prenatal care in this pregnancy.

Physical examination revealed a temperature of 36.8C, blood pressure: 120/75mmHg, pulse rate of 78/ min, and respiratory rate of 16/min.

Uterine contraction interval = 2minute, with duration = 50'', cervical dilatation = 10cm, cervical effacement = 100%, station = -1, presentation = vertex, position = ROT with posterior Asynclitism and molding. Fetal heart rate = 144 beats per minute.

An emergency cesarean section was performed; the neonatal was born with 1 minute and 5 minute Apgar score 7 and 9. The infant was transported to the neonatal intensive care unit.

When the patient was admitted to the labor suite, hemoglobin = 10/5mg/dl and 6 hours after cesarean section, hemoglobin =

9/8mg/dl .Testing for syphilis, hepatitis B surface antigen, human immunodeficiency (HIV) are non reactive. First hours after C/S vital signs were stable. She was agitated and received 10 mg morphine and 10 mg diazepam in intensive unit. But she was restless and wanted more Illicit drugs. Suddenly blood pressure and pulse rate did not record by pulse oxymetry.

The patient was pronounced dead 13 hours after cesarean section in intensive care unit Her physicians suspected myocardial infarction, cerebral hemorrhage, amniotic fluid embolism or massive pulmonary embolism.

Autopsy detects 2/5 liter blood in retroperitoneal space, and rapture of aortic aneurysm.

Her neonatal suffered from post natal abstinence syndrome and morphine was used as the analgesic and withdrawal drug in NICU.

### **Discussion**

Abdominal aortic aneurysms represent a degenerative process in the media of the arterial wall, resulting in a slow and continuous dilatation of the lumen of the vessel (8, 9).

The aortic wall contains smooth muscle, elastin and collagen arranged in concentric

layers in order to withstand arterial pressure (1, 8, 9).

Elastin is the principal load –bearing element in the aorta. Elastin degeneration and fragmentation are observed in aneurysm wall of aorta(10).

Most patient with aortic dissection are predisposed to a weakened or torn aorta to several factors (1, 3). The most common cause is atherosclerosis (1, 3, 8, 9, 11). Other causes include hereditary connective tissue disorders, such as Marfan and Ehlers-Danlos syndromes, granulomatous vasculitis of the aorta, chest trauma caused by a motor-vehicle accident, Turner syndrome (1-3, 8, 9, 12). Another risk factor for aortic dissection is the use crack cocaine in pregnant woman (3, 13).

The proposed mechanism of aortic dissection during cocaine abuse is mediated through catecholamine-induced, vasoconstriction, acute profound elevation of heart rate, BP and myocardial contractility causing a rapid rise in the derivative of pressure on the aortic wall resulting intima tear (14, 15).

Cardiovascular changes during pregnancy are: increased stroke volume, blood volume, heart rate, cardiac output and increase in the left ventricular wall mass (2). The increased

production of estrogens, prostacyclins, nitric oxide contributes to a decrease in peripheral vascular resistance in aortic compliance (2). Nitric oxide is involved in the progression of AAA (16).

Rupture of the aorta in pregnancy usually occurs when blood volume and cardiac output are rising to a maximum. It has been known to occur at all stages of pregnancy and during the weeks after delivery.

Cocaine use and activities that cause sudden rise in blood pressure such as weight lifting have been implicated (4).

High blood pressure generated during weight changing, an increased ventricular ejection forces, accompanied by the Valsalva maneuver may be the cause of aortic dissection (5, 9).

Most people with AAA have no symptoms unless the aneurysm ruptures. Occasionally AAA can produce abdominal or back pain, or a tender spot in the abdomen (1, 3, 8, 9, 12). Rupture of an AAA usually causes massive internal bleeding and is often quickly fatal (17, 18).

Patients may have normal vital signs in the presence of ruptured AAA due to retroperitoneal containment of hematoma. Presence of a pulsatile abdominal mass is virtually diagnostic but is found in less than

half of cases. The diagnosis may be confused with renal calculus, diverticulitis, incarcerated hernia, or lumbar spine disease (1, 3, 8, 9, 12, 19).

**Diagnosis:** Abdominal aortic aneurysm may be diagnosed with these tests:

Abdominal X-ray—Abdominal ultrasound—CT scan of abdomen—MRI of abdomen—Angiography of aorta—Trans esophageal Echocardiography (TEE)—Computed tomographic (C T) angiography (1, 3, 8, 9, 19, 20). An X-ray of the abdomen will show calcium deposits lining the wall of an AAA. An ultrasound scan is the easiest way to detect an AAA. The size of the aneurysm can be measured by ultrasound.

CT scan of the abdomen can be effective in both, detection of the aneurysm and it can help in determination other intra abdominal pathologies. CT scanning is less invasive .Sensitivities of 83 to94%, specificities of 87 to 100% have been reported for the diagnosis of AAA dissection. This study allows rapid diagnosis in emergency situation. CT findings in aortic dissection include an intimal flap, intramural hematoma, displaced intimal calcifications, and abnormal vascular contour (1, 3, 8, 9, 12).

CT angiography has become an important imaging technique that will give an accurate three-dimensional view of the aorta. It has sensitivity 96 to 100% and a specificity of 96 to 100%.Surgeon can get all information needed for planning optimal surgical therapy with this imaging technique (20).

MRI: An MRI examination of the aorta will produce a three-dimensional reconstruction of the aorta. T he MRI can detect aortic dissection accurately, can demonstrate the site of the entry tear. MRI allowing the physician determines the renal artery involvement and surgeon can delineate the extent of the dissection. Both the sensitivity and specificity of MRI are 95 to 100% (1, 3, 8, 9, 12) MRI, TEE, CT scanning are all extremely accurate in the diagnosis of aortic aneurysm. CT, MRI measures external aortic diameter whereas echocardiography measures internal aortic diameter (3, 8, 9, 12).

Treatment: It is essential that the medical treatment play a central role in critically evaluating the evidence related to drugs, devices, and procedures for detection, management of AAA. Current guidelines suggest repair as the aneurysm diameter reaches 5 to5/5 cm (11). T he aims of the medical therapy is to normalize blood

pressure and to reduce the force of the left ventricular ejection, which are the determinants of AAA. Beta-blockers first, other antihypertensive such as vasodilators, and adequate analgesia should be initiated to keep heart rate < 60 bpm and blood pressure < 120mmHg. When beta-blocker is contraindicated, such as asthma, sign of heart failure, consider using calcium channel blockers (1, 9, 12). Some Research's suggests that the aneurysms morphology and size may increase the risk of rupture.

Surgical outcomes may be improved using endovascular aneurysm repair (EVAR), but aortic repair using endografts under emergency circumstances is not universally available (21).

### Conclusions

AAA also are less common in women than in men, and , as with coronary heart disease, there is evidence that women with AAA also have a worse prognosis. AAA in pregnancy is uncommon and occurs in the late stage of pregnancy. Complication related to cocaine abuse includes myocardial ischemia, thrombosis, aortic dissection, sudden cardiac death.

Crack cocaine smoking cessation, healthy lifestyle, preconception counseling and

prenatal care are associated with lower risk of maternal mortality (2, 22, 23).

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