nary hypoplasia should be added to the list of congenital coronary arterial anomalies associated with exercise-related sudden death.

REFERENCES
1. Waller BF, Roberts WC. Sudden death while running in conditioned runners aged 40 years or over. Am J Cardiol 1980; 45:1292-1300

Surgical Management of Recurrent Spontaneous Pneumothorax during Pregnancy

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We report three cases of recurrent spontaneous pneumothorax associated with pregnancy. All three cases had apical bullectomies during their pregnancies.

Spontaneous pneumothorax in pregnancy is said to be a rare condition. There have been only 12 cases reported in the English literature in the last three decades.1,4 We present three case reports of spontaneous pneumothorax associated with pregnancy. All three patients were managed by operation during pregnancy which, to our knowledge, has not previously been reported.

CASE REPORTS

CASE 1

A 25-year-old Caucasian G1P1SA, previously healthy with last normal menstrual period (LNMP) December 11, 1984, Brevinex positive on January 18, 1984, was admitted at four weeks’ gestation with a moderate-sized right spontaneous pneumothorax. This was treated by chest tube drainage with complete resolution. At five weeks’ gestation, the patient developed a moderate left spontaneous pneumothorax treated successfully by chest tube drainage. Left pneumothorax recurred at six weeks’ gestation and again was treated by chest tube drainage, but failed to resolve completely.

At eight weeks’ gestation, the patient electively underwent bilateral apical bullectomy and pleural abrasion, through midline incision, under general anesthesia. There was no postoperative complication.

At 35 weeks’ gestation, the patient developed mild cholestasis of pregnancy. At term, a healthy normal female infant (weight 3,575 g, with Apgar scores of 7 and 9 at one and five minutes respectively) was delivered with Simpson forceps.

CASE 2

A 26-year-old Caucasian G2P1, previously healthy with LNMP September 26, 1981, Brevinex positive November 9, 1981, presented at eight weeks’ gestation with a small right pneumothorax which was treated with rest and observation. At 11 weeks’ gestation, a small recurrent right spontaneous pneumothorax was treated with needle aspiration. At 13 weeks’ gestation, she had further recurrence of the right spontaneous pneumothorax of moderate size, treated with chest tube drainage successfully. At 18 weeks’ gestation, a further recurrence of the right pneumothorax was treated by needle aspiration.

At 22 weeks’ gestation, the patient electively underwent right transaxial apical wedge resection and apical pleurectomy under general anesthesia. There were no postoperative complications.

At term, a healthy normal female infant (weight 3,010 g, with Apgar scores of 1 and 9 at one and five minutes respectively) was delivered with Kielland forceps. A subsequent pregnancy two years later was uneventful.

CASE 3

A 28-year-old Caucasian G2P1 with previous history of left spontaneous pneumothorax at age 17 and right spontaneous pneumothorax at age 23, had a small spontaneous right pneumothorax in March, 1960, treated with observation. Her LNMP was May 28, 1960. At 14 weeks’ gestation, she was admitted with a small right pneumothorax and treated with observation.

At 24 weeks’ gestation, the patient electively underwent right transaxial apical wedge resection and apical pleurectomy under general anesthesia. The fetus was monitored intraoperatively by ultrasonic cardiotocography. There was no postoperative complication.

She delivered, at term, a healthy normal male infant (weight 4,190 gm, with Apgar scores of 9 and 9 at one and five minutes respectively) with Simpson forceps.

DISCUSSION

Spontaneous pneumothorax in pregnancy is said to be extremely rare, as witnessed by the paucity of reported cases in the English literature.4 However, we have seen three cases in the last four years at our hospital. Many authors1,4 have suggested that underreporting is responsible for the apparent infrequency of this condition, and our experience strengthens this viewpoint.

Of the 12 reported cases, only two occurred during the first trimester,1,4 and the rest in the last trimester, mostly at term.4 At our hospital, all three cases were seen in early pregnancy (4, 8, and 14 weeks). Two had no previous history of pneumothorax. All had recurrent episodes during their pregnancy prior to surgical treatment.

In a previously healthy young population, spontaneous pneumothorax is almost always related to the presence of small apical blebs or bullae without other significant pulmonary disease. The risk of recurrence following the initial episodes is almost 30 percent,4 and the risk thereafter is about 50 percent, with overall incidence of recurrence about

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33 to 44 percent. 

Maternal oxygen consumption is increased 20 percent during pregnancy and 50 percent during labor. FRC is decreased by 10 to 20 percent. Ventilation-perfusion mismatch is accentuated in the supine position. Any impairment in ventilation in the pregnant patient may produce hypoxemia more readily than in the non-pregnant individual. In a normal pregnancy, fetal umbilical vein PO₂ is about 35 to 45 mm Hg; hence, there is little reserve if maternal PO₂ starts to fall. Therefore, pneumothorax during pregnancy is potentially a serious risk, both to mother and fetus. It can pose particularly difficult problems in rapid diagnosis and management, especially during labor and delivery. 

All of our patients had recurrent pneumothorax during pregnancy and underwent elective thoracotomy in order to prevent further episodes. The risk of teratogenicity with various modern anesthetic drugs is not known, but no specific teratogenic effects have been identified in human subjects. Organogenesis of vital parts is usually complete at eight weeks. No study has demonstrated an increased risk of spontaneous abortion or premature labor following general anesthesia.

The limited transaxillary operative approach seems particularly well-suited for unilateral operation, because of its very low morbidity and rare recurrence. Median sternotomy is a suitable approach where bilateral pneumothorax must be treated. In almost all instances, apical subpleural blebs can be dealt with by local excision or limited lung resection. This is associated with minimal disturbance of pulmonary function postoperatively. In our experience, excision or dry gauze abrasion of the apical pleura has been equally effective in preventing recurrence without obliterating the entire pleural space. 

Indications for operative treatment of pneumothorax, in general, are not absolutely defined. We believe that the usually accepted indications for operation (persistence despite adequate drainage or multiple recurrences) are valid during pregnancy. Indeed, we would opt for an aggressive approach to the management of the recurrent pneumothorax in the hope of avoiding serious problems at the least desirable time—parturition. We conclude that pneumothorax can be safely and successfully treated during pregnancy by current surgical means with careful anesthesia and monitoring. The optimal timing of operation would seem to be after the early part of pregnancy (first eight weeks) and before pregnancy is far advanced.

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REFERENCES
2 Vance JP. Tension pneumothorax in labour. Anesthesia 1968; 23:94-97
4 Stewart B. Spontaneous pneumothorax and pregnancy. Can Med Assoc J 1978; 121:25

Radiographic Pseudoaurectomy of Bipolar Pacemaker Wire*

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We present a case in which the radiographic appearance of a bipolar pacing lead mimics a wire fracture. Recognition of this normal finding—due to lead construction—will help avoid erroneous diagnosis of wire fracture on chest x-ray films.

Permanent pacemaker failure may occur as a result of a variety of causes including wire displacement, battery depletion, threshold elevation and wire fracture.1 With improved materials and technology, there has been a decrease in the number of lead fractures, but this problem still occurs. Approximately 1 to 7 percent of pacemaker lead problems are due to endocardial permanent lead fractures.2,3 In evaluating a patient with pacemaker failure, the physician should be aware that a lead may normally appear to be discontinuous on chest x-ray films and this radiographic finding may be misleading. We describe a patient who presented with pacemaker failure and was found to have both a loss of insulation and a pseudo fracture of her pacemaker lead. A pseudo fracture is an apparent break in the wire as seen on chest x-ray film with actual maintenance of continuity.

CASE REPORT

An 80-year-old black woman with a permanent pacemaker was admitted to Beth Israel Hospital for a one month history of increasing fatigue, dyspnea, orthopnea, paroxysmal nocturnal dyspnea and dizziness. The patient had been treating herself with increasing doses of digoxin and Nitropaste. She was referred from her private physician's office where she had a pulse rate of 40 beats per minute (bpm). ECG revealed failure of her artificial pacemaker to sense or capture. The patient had received a Medtronic permanent VVI pacemaker model 5984 with a Medtronic model 6972 bipolar lead in November, 1981. The indication for the pacemaker was symptomatic severe sinus

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