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## Successful Singleton and Twin Pregnancies With the Nuss Bars in Place

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Pectus excavatum (PE) occurs less commonly in women, and the implications on a pregnancy after repair during the period when support bars are in place are unknown. We present 2 cases: 1 with a successful twin gestation and another with a successful singleton gestation. These women carried the pregnancies to term and delivered their infants with the Nuss bars in place.

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Pectus excavatum (PE) is the most common congenital chest wall deformity [1]. It is characterized by depression of the anterior chest wall and is less common in women. Minimally invasive PE surgical repair is used for both pediatric and adult patients and requires the intrathoracic substernal placement of 1 or more stainless steel or titanium bars [2]. The bars remain in place 2 to 3 years and are removed once the chest wall correction is deemed stable. It is unknown whether the presence of the substernal bars affects pregnancy and if bars should be removed before conception [3]. We present 2 cases of successful pregnancies, including 1 twin pregnancy, in patients having multiple pectus bars in place.

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## Case Reports

### Patient 1

A 29-year-old white woman with severe recurrent PE (Fig 1A) had a history of Ravitch repair at age 2 years with a right breast implant subsequently placed during adolescence because of severe chest deformity and unilateral breast hypoplasia. She presented with exercise intolerance and exertional chest pain. A minimally invasive PE surgical repair was performed with placement of 3 support bars and exchange of her right implant (Fig 1B). She became pregnant with twins less than 1 year postoperatively. No significant issues were reported during her pregnancy other than mild dyspnea with exertion and a sensation of outward pressure on the lower ribs. She delivered healthy identical twin boys by cesarean section at 37 weeks.

### Patient 2

A 38-year-Korean/white woman with severe PE and right heart compression (Figs 2A, 2B) had previously undergone breast implantation with good cosmesis but had become increasingly dyspneic and tachycardic, with progressive exercise intolerance over the preceding 5 years. She underwent minimally invasive PE surgical repair with 2 pectus support bars as well as placement of acellular dermal mesh bilaterally as a barrier between the implants and the support bars (Figs 2C, 2D). She became pregnant approximately 22 months after PE repair. Her pregnancy was complicated by placenta previa and severe anemia, but she delivered a healthy boy by cesarean section at 38 weeks.

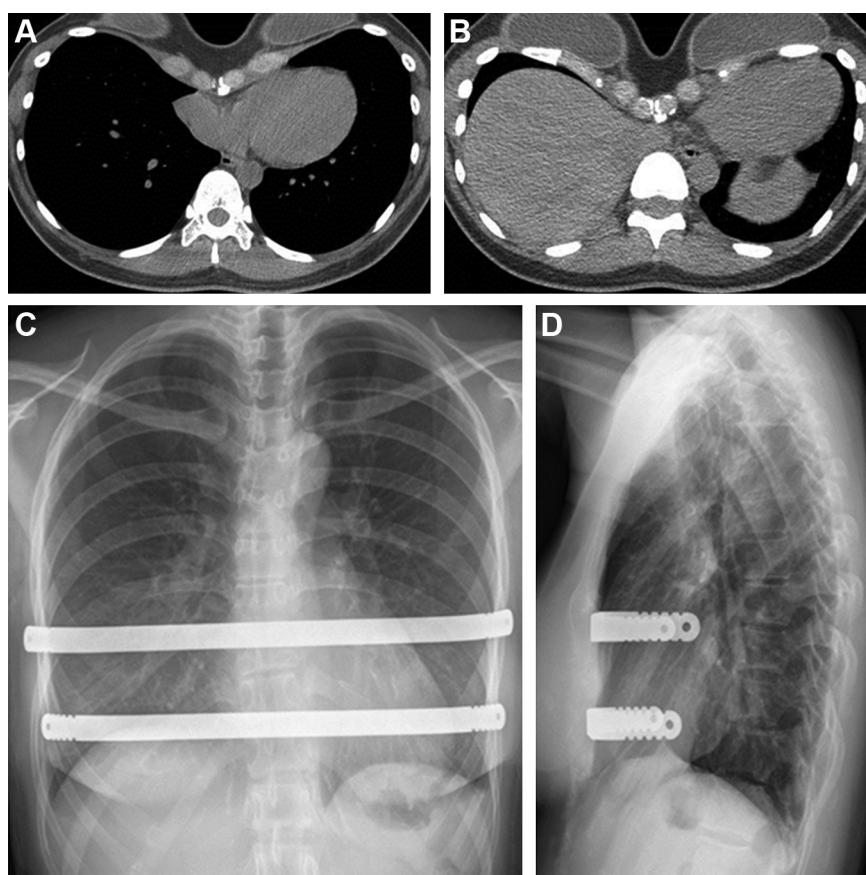
## Comment

PE occurs in 1 in 300 to 400 births and is 5 times less common in women [1], possibly in part because of breast development or implant placement concealing the deformity. Severe cases of PE may be associated with cardiac compression and a reduced cardiac index [4]. During pregnancy, a significant increase in cardiac output and plasma volume is necessary to perfuse the uterus [5]. Severe PE may restrict ventricular volume and prevent this necessary increase in stroke volume. Many anatomic changes are known to occur during pregnancy, including elevation of the diaphragm. Theoretical concerns could be raised because of the rigidity of the anterior chest wall caused by the pectus bars in pregnant patients or other unknown effects of the bars. Also, the risk of bar displacement should be considered, which may result from bar flipping or lateral sliding caused by unequal pressure exerted on each side of the bar [3]. Two previous successful singleton births have been reported [3]. We present an additional singleton pregnancy as well as a twin pregnancy uncomplicated by the presence of multiple pectus bars.

Fig 1. (A) Thoracic computed tomographic scan in a pregnant patient with pectus excavatum (PE) shows cardiac compression index of 2.81, Haller index of 4.26, and corrective index of 32%. (B) Lateral chest roentgenogram after PE repair shows 3 appropriately positioned support bars.



Fig 2. (A and B) Axial thoracic computed tomographic scans in a pregnant patient with pectus excavatum (PE) shows cardiac compression index of 3.74, Haller index of 15.72, and corrective index of 75%. (C) Frontal and (D) lateral chest roentgenograms after PE repair show 2 appropriately positioned support bars.



Our experience suggests that it is possible for women to complete a successful pregnancy after PE repair with pectus bars remaining in place. Further studies including evaluation of pregnant patients with PE with and without repair would greatly complement the existing literature.

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