INTRODUCTION

TO A FRIEND WHOSE WORK HAS COME TO NOTHING

Now all the truth is out,
Be secret and take defeat
From any brazen throat,
For how can you compete,
Being honour bred, with one
Who, were it proved he lies,
Were neither shamed in his own
Nor in his neighbours’ eyes?
Bred to a harder thing
Than Triumph, turn away
And like a laughing string
Whereon mad fingers play
Amid a place of stone,
Be secret and exult,
Because of all things known
That is the most difficult.

W.B. Yeats (1)
Unlike Yeats’ friend, the surgeon whose work has met with need for reoperation cannot only console himself with having made a sturdy effort at the first procedure. Reoperative surgery for chest wall problems demands thorough evaluation of the patient, the previous treatment, and careful planning for revision. In this chapter we will review recurrent pectus excavatum, carinatum, and some less frequent conditions affecting the chest wall.

**RECURRENT PECTUS EXCAVATUM**

**Clinical Presentation**

Reoperative pediatric surgery for pectus excavatum almost always involves recurrent chest wall depression after previous repair. Occasionally, the condition complicates surgical treatment for some other condition, such as congenital diaphragmatic hernia or lung resection.

Pectus excavatum can occur or reoccur following any of the operations employed to repair it. Because pectus excavatum is an obvious physical deformity, screening is not required postoperation.

Frequency of recurrence following the open or Ravitch operation was reviewed and summarized by Ellis and colleagues in a 1997 report (2). Recurrence rates were reported to be 2% by Fonkalsrud, 2.4% by Shamberger, 5% by Haller et al. in a contemporary report, 6% by Sanger et al., 10% by Gilbert, 11.8% by Singh, 16% by Pena, and 20.5% by Willital and Meier if no internal supporting bar was used, but only 8.9% if a bar was used (2). Subsequent to Ellis’s review, Lacquet in 1998 reported 16% unsatisfactory results in a large series (3). Ellis and colleagues supported the observation of others that recurrence was related to a limited procedure at the first operation. When they operated on recurrences after operation by other surgeons, they found deformed cartilages, which appeared to be untouched. However, it is worth emphasizing that recurrence happens for unclear reasons. Recurrence affects patients of even the most expert surgeons at all centers reporting in the literature.

Two reports cite a higher recurrence in Marfan patients (4,5). Of 28 patients with Marfan syndrome and pectus excavatum in a 1989 Johns Hopkins report, 11 recurred (5). Haller and colleagues recommended delay in repair until skeletal maturity had been achieved, and internal stabilization with an Adkins strut.

Recurrence rates after the Nuss repair are less well established, because the operation only came into general use in 1997, less than 10 years ago as of this writing. Numerous observers have pointed out that until a large cohort of children who have undergone the repair have passed through puberty, reliable recurrence rates will not be available. It is important to distinguish in these patients an early bar shift and recurrence after removal of the bars is done 2 years postoperation. In our series of almost 800 patients with pectus excavatum, bar shift has occurred approximately 13% of the time in the first 100 patients, while the procedure was in evolution; with current methods of securing the bar it is approximately 0.5% (1/245 patients). Park recorded bar displacement in 2.4% of 335 patients (6). Early bar shift presently is often related to some unexpected event such as being tackled by uninformed friends or a violent twisting motion. Late recurrence has occurred in 0.9% (7/794) of patients treated at Children’s Hospital of the King’s Daughters (CHKD)/Eastern Virginia Medical School (EVMS).

Timing of recurrence is affected by the type of repair. There are two operations in common use: the open or “Ravitch” repair (attributed by Ravitch himself as a variation