Minimally-Invasive Endoscopic Correction of Funnel Chest Deformity Via an Umbilical Incision

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Abstract. Congenital funnel chest deformities (pectus excavatum) are a well known condition that may require surgical correction if repercussions on the respiratory and cardiac dynamics are caused by the compression on the mediastinal structures and by the reduction of the respiratory volume. However, the aesthetic defect may have serious psychological implications and—even if no respiratory impairment is caused—may nevertheless indicate aesthetic correction by implanting a custom-made prosthesis. Alloplastic correction traditionally results in long, visible scars. Since the pre sternal area is prone to hypertrophic scarring, this type of scar may be a disturbing complication of the intervention. Endoscopically-assisted minimally-invasive implantation of customized implants via an umbilical incision to introduce a customized single-unit silicone implant can avoid unsightly scarring and allows safe hemostasis in the dissection pocket, minimizing well-known side effects and patient morbidity.

Key words: Funnel chest—Minimally-invasive plastic surgery—Endoscopy

The congenital depressive malformation of the sternum (Pectus excavatum) represents the most common deformity of the chest wall. It has been the subject of many studies because of its various inherent problems since the initial description in 1594 by Johannes Schenk [10]. The overwhelming majority of patients with pectus excavatum have no physiologic compromise. The cosmetic defects of pectus excavatum and bilateral mammary hypoplasia can be corrected with a single-unit customized silicone implant. We report upon the minimally invasive endoscopically assisted implantation of a customized one piece silicone implant introduced via an umbilical incision.

Case Report

A 19-year-old female patient presented with bilateral hypoplasia of the breast and mild funnel chest deformity. There were no signs of clinically reduced respiratory function, and the patient was not suffering from restrictions in her daily activities. No further pathological signs were found. She complained of severe psychological repressions with serious implications, especially for what concerned her affective life and social relationships (Fig. 1).

After three-dimensional CT scanning and molding, a custom-made silicone rubber implant was manufactured according to the desired volume (Fig 2). A small semicircular skin incision was placed around the superior margin of the umbilicus and the dissection of the implant pocket was performed endoscopically (Fig. 3). An extended pocket was created across the anterior chest wall. The prostheses had to be folded tube-like to be passed through the umbilical incision into the final subcutaneous position (Fig. 4a,b). Simultaneous breast augmentation was not desired by the patient. A good cosmetic result occurred with minimal morbidity and no scarring besides the umbilical incision line.

A postoperative seroma formation required two repeated punctures. The further course was uneventful. The patient was very satisfied with the result during the follow up and reported upon a significant improvement in her social activities.
Discussion

Only recently have the latest techniques of diagnosis, cardiology, and radiology shed more light on the repercussions of the pectus excavatum deformity on the respiratory and cardiac dynamics caused by the compression on the mediastinal structures and by the reduction of the respiratory volume. The aesthetic defect, often the first aspect to attract the attention of patient and doctor, has serious psychological implications, especially for what concerns the affective life and social relationships in general.

The surgical therapy usually consists in radical interventions with large sternocostal resections and repositioning of the sternum (turnover), or interventions with a less invasive technique to correct only the aesthetic defect [10]. There has been a controversial debate as to whether surgical interventions should be performed and about advantages and disadvantages of these techniques, especially in relation to the