Use of Synthetic Mesh and Donor Grafts in Gynecologic Surgery

Neeraj Kohli, MD, and John R. Miklos, MD*

Address
*Mount Auburn Hospital, 300 Mount Auburn Street, Suite 302, Cambridge, MA 02138, USA.
E-mail: nkohlimd@hotmail.com

Current Women's Health Reports 2001, 1:53–60
Current Science Inc. ISSN 1534-5874

Traditional surgery for the correction of pelvic organ prolapse continues to result in suboptimal long-term cure rates. In an effort to improve clinical outcomes, various new surgical techniques have been proposed and use of synthetic and donor graft has been advocated. Although the technique of graft placement for the correction of anterior, posterior, and apical vaginal wall reconstruction is easy to perform, controversy exists regarding the optimal choice of material. Synthetic materials have the advantage of being readily available, cost-effective, and consistent in quality, but may present with significant complications, including infection and erosion. In contrast, autologous and heterologous donor grafts provide naturally occurring biomaterials that may undergo desired remodelling, but the in vivo tissue response is still not fully understood. The use of graft materials is still in an early period of evaluation and it is expected that its use will steadily rise with increasing experience and new product development. The following review analyzes our current experience with the use of graft materials in reconstructive pelvic surgery.

Introduction

Over the past four decades, there has been growing interest in the use of synthetic and donor graft materials for the surgical correction of pelvic prolapse, due to suboptimal long-term cure rates noted with traditional surgical techniques. Traditional techniques depend on plication of attenuated endopelvic fascia or accurate identification of site-specific defects. The use of graft interposition, either synthetic or donor, helps to reduce failure rates from breakdown of weakened tissue or failure to identify all present defects. Furthermore, readily available synthetic and donor products obviate the need for a separate tissue-harvesting procedure, reduce operative time and procedure charges, and provide materials that may be stronger than the patient's own fascial tissue. Despite these potential benefits, widespread use of grafts in gynecologic surgery is still in its infancy, due to poor understanding of the in vivo response to the graft material and a paucity of long-term clinical data supporting its use. Although the basic techniques of graft use are generally accepted, the indications for use and choice of material remain controversial.

Much of the initial data on synthetic mesh and donor allografts are derived from surgery research for repair of abdominal wall hernias, reconstruction of joints, and cosmetic treatment of burn victims. In gynecologic surgery, mesh and graft use can be categorized based on surgical procedures used primarily for the correction of pelvic prolapse. Synthetic and autologous materials have been extensively used in the areas of urology and urogynecology as materials for the suburethral sling procedure, and there is currently great controversy regarding the optimal material that provides good long-term results with minimal complications. The following review is limited to the current literature, techniques, and outcomes using both synthetic and autologous grafts in reconstructive pelvic surgery.

General Properties of Synthetic and Natural Graft Materials

Synthetic materials

Despite recent technologic advances in the design and study of synthetic materials, the ideal synthetic biocompatible material has yet to be developed. The use of synthetic mash dates back to the mid-1950s when Cumberland [1] and Scales [2] reported their experience with synthetic materials for the treatment of ventral hernia repair and orthopedic prostheses. Since that time, extensive research has further defined critical in vitro and in vivo properties of synthetic materials with respect to implantation. Compared with autologous donor grafts, synthetic materials offer the advantage of ready availability, lower cost, consistent strength, and predictable in vivo tissue response. Disadvantages of synthetic material include failure of remodeling, limited stretch properties, and potential of erosion or infection.

All mesh materials should be chemically and physically inert, noncarcinogenic, mechanically strong, and easily fabricated and sterilized. They should all have a high minimum tensile strength (> 50 N) that will provide adequate strength to withstand pressure placed on the pelvic floor during episodes of increased abdominal pressure. Synthetic mesh materials vary in their ability to withstand