INTRODUCTION

Urinary incontinence (UI), defined as the involuntary leakage of urine sufficient to be a problem, afflicts approx 13 to 14 million Americans and, according to the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), 11 million of them are women. One half of the residents of nursing homes are incontinent. In 1995, Americans spent approx $27.8 billion on the management of UI. Based on NIDDK statistics, the average patient with UI spent $3941 annually on the problem.

Among the various therapies available for management of UI, are use of pharmacological agents, bladder retraining, and surgical procedures, such as cystourethropexies, sling procedures, or injection of bulking
agents. In patients who have failed conventional treatments, the artificial urinary sphincter (AUS) is a reasonable alternative.

In 1973, F. Brantley Scott, along with Dr. Bradley and Dr. Timm, developed and implanted the first AUS. Since then, approx 3000 AUS devices have been implanted. American Medical Systems, the corporation that manufactures the device has made many improvements in its components and quality. The 800 model was first introduced in 1979, has undergone several modifications including introduction of kink-proof tubing and a more efficient and resilient narrow back cuff. Two-hundred and thirty-nine females have undergone implantation of the AUS by the authors since 1973. Of these, 108 received the earlier models (AUS 791/792) and 68 received the AS 800. The majority of these patients suffered from urethral sphincter incompetence of varying etiologies including myelomeningocele, pelvic floor weakness with stress incontinence, and neurogenic bladders. In all of them, more conservative attempts at restoring continence had failed. Many other centers have used the AUS for treatment of urinary incontinence in females. In this chapter, the authors will review their and other’s experience with this device.

ARTIFICIAL URINARY SPHINCTER

The basic objective of the AUS is to provide patients with dynamic control of the resistance to the bladder outflow as opposed to simply obstructing the outlet as with a sling procedure or with collagen injection. The latest device is the American Medical System AS 800 (see Fig. 1), which consists of three components made of medical-grade silicon: an occlusive cuff of variable length positioned around the bladder neck, a pump with a locking mechanism placed inside the labia majora, as well as a dip coated pressure control balloon implanted in the paravesical space (see Fig. 2). All of these components are interconnected with nylon-reinforced nonkinking silicon tubing. The system is filled with either normal saline or, preferably, an isotonic contrast solution that allows visualization of the device on X-ray. Normally, the device is in a closed position with the cuff inflated and uniformly compressing the bladder neck and proximal urethra. When the patient needs to urinate, she compresses the labial pump, which transfers fluid from the cuff to the balloon thereby permitting urine outflow.

The 2.0-cm-wide occlusive cuff is a longitudinal silicon balloon that incorporates a narrower (1.7 cm) outside Dacron layer with a snap-like closure. It is available in various lengths from 4.0 cm to 11.0 cm. The narrower backing improves the efficiency of the cuff and decreases the incidence of tissue pressure atrophy. An additional internal coating