

urinary system distress, and decreases the need for reconstructive surgery of the lower urinary tract ([Snodgrass and Gargollo, 2010](#); [Tarcn, Onol, Ilker, et al, 2006](#)).

Treatment of renal problems includes (1) regular urologic care with prompt and vigorous treatment of infections; (2) a method of regular emptying of the bladder, such as **clean intermittent catheterization (CIC)** taught to and performed by parents and self-catheterization taught to children; (3) medications to improve bladder storage and continence, such as oxybutynin chloride (Ditropan) and tolterodine (Detrol); and (4) surgical procedures such as **vesicostomy** (bladder surgically brought out to the abdominal wall, allowing continuous urinary drainage) and **augmentation enterocystoplasty** (using a segment of bowel or stomach to increase bladder capacity, thereby reducing high bladder pressures).

However, despite the combined efforts of CIC, medication, and surgical intervention, some children with myelodysplasia may continue to experience debilitating urinary incontinence. Many of these children are able to attain social continence with a continent **urinary diversion** commonly referred to as a *Mitrofanoff procedure*. In this procedure, a catheterizable channel is surgically created from appendix, ureter, or tapered bowel. The proximal end of the channel is connected to the bladder with the distal end brought out as a small stoma on the abdominal wall, usually near the umbilicus. The bladder neck may be sutured to prevent urinary leakage from the urethra. CIC through the easily accessible abdominal route fosters greater independence in children, especially in those unable to transfer from wheelchair to toilet to perform CIC.

## **Bowel Control**

Some degree of fecal continence can be achieved in most children with myelomeningocele with diet modification, regular toilet habits, and prevention of constipation and impaction. It is frequently a lengthy process. Dietary fiber supplements (recommended 10 g/day), laxatives, suppositories, or enemas aid in producing regular evacuation. Older children and adolescents seeking more independence may attain bowel continence and higher quality of life after undergoing an **antegrade continence enema (ACE)** procedure ([Doolin, 2006](#)). In a procedure similar to