Calendar of Events

May 31, Toronto, Ontario: "Legal Issues in Nursing Practice," Latvian Centre. (Sponsored by Centennial College, School of Health Sciences. (416) 694-3241, ext. 3351).

June 1 - 3, Corner Brook, Newfoundland:
10th Annual Conference, Newfoundland and Labrador Operating Room Nurses Association, Glynmill Inn. (Contact Angela Lemoine, P.R., P.O. Box 67 W.E.P.S., Corner Brook, Newfoundland A2H 3J0).

June 11 - 13, Winnipeg, Manitoba:
3rd Biennial Conference of the Manitoba Operating Room Nurses Association, Delta Hotel. (Contact Bev Popowich, Co-ordinator, O.R. PAR, and Day Surgery, Misericordia General Hospital, 99 Cornish Ave., Winnipeg, MB R3M 1E2 (204) 774-6581).

June 11 - 13, Winnipeg, Manitoba:
Second Biennial Conference, Manitoba Association of Post Anaesthesia Nurses (PACU), Westin Hotel. (Contact Jan Borlase, Conference Chairperson, 99 Cornish Avenue, Winnipeg, MB R3C 1A2).

August 28 - September 1, Vienna, Austria
Sixth World Conference of Operating Room Nurses, Austria Centre, Vienna. (Details, AORN Meeting Services Department, 10170 East Mississippi Avenue, Denver, Colorado 80231).

September 15 - 17, Saskatoon, Sask.:
5th Annual Saskatchewan Operating Room Nurses Group Conference. Sheraton Cavalier Hotel, Saskatoon. (Contact Darlene Stuttard, Provincial Co-ordinator, City Hospital, 7th Ave. & Queen Street, Saskatoon, SK. S7K 0M7 (306) 934-8030).

September 28 - 29, North Bay, Ontario:
15th Annual Conference, Northern Ontario Operating Room Interest Group - NOORIG. (For details Mary Rankin, North Bay Civic Hospital, 750 Scollard Street, North Bay, Ontario P1B 1C1).

October 4 - 6, Montreal, Quebec:
23rd Annual Provincial Conference, L'association des infirmiers(es) des salles d'operation du Quebec, Centre des Congres de Laval a Laval, Montreal, Quebec. (Contact Monique Dugay, Hopital General LaSalle, 8585 Terrasse Champlain, LaSalle, Quebec H8P 1C1 (514) 365-1510).

October 19 - 22, Medicine Hat, Alberta:
Annual Provincial Conference, Operating Room Nurses of Alberta, Medicine Hat Lodge and Cypress Centre. (For more information contact Marge Ensminger, Chairperson, 340 - 14th Street North East, Medicine Hat, Alberta T1A 5V8 (403) 527-2122).

April 2 - 6, 1990, Toronto, Ontario:
11th National Operating Room Nurses Conference, Harbour Castle (Westin) Hotel. **Delegates** contact Audrey MacDonald, Operating Room, Mount Sinai Hospital, 600 University Avenue, Toronto, Ontario M5G 1X5. **Exhibitors** contact Valerie Shirreff, Operating Room, Mississauga Hospital, 100 Queensway West, Mississauga, Ontario L5B 1B8).

General Journal Information

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Canadian Journal of Nursing Administration
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Implanting an artificial urinary sphincter

By Marion H. McLean, R.N.

The artificial urinary sphincter (AUS) is an internally implanted prosthesis used to correct urinary incontinence problems. While the AUS has successfully been implanted in both adults and children, the following summary specifically concerns surgical procedures followed at the Hospital for Sick Children in Toronto, Ontario.

More than sixty AUSs have been implanted in children aged four to nineteen at the Hospital for Sick Children. All of these patients were totally incontinent and had not responded to drug therapy or intermittent catheterization.

Anatomy and physiology

The urinary bladder is a hollow muscular viscus that acts as a reservoir for urine until micturition occurs. The floor of the bladder is composed of the trigone, which is triangular. The three corners of the trigone correspond to the orifices of the ureters and the bladder neck (opening of the urethra). The bladder fills with urine, thereby expanding into the abdominal cavity. **(See Figure 1)**

The process of bladder evacuation appears to be initiated by nerve cells from the sacral divisions of the autonomic nervous system. These sacral reflex centres are controlled by higher voluntary centres in the brain. Stimulation of the sacral centres results in contraction of the bladder muscles and relaxation of the bladder outlet sphincters. Muscle tone maintains closure of the sphincters when the bladder is at rest, thus enabling continence. Neurogenic bladder and bladder exstrophy (the congenital turning inside out of the bladder) usually result in lack of adequate storage capacity and emptying problems.

How the implant works

The artificial urinary sphincter consists of three main parts:

1. a control pump
2. an occlusive cuff
3. a pressure-regulating balloon

When implanted, the prosthesis simulates normal spincter function by opening and closing the urethra at the patient's control.

When the patient wishes to void, he or she squeezes the control pump (implanted in the scrotum or labium) several times. This causes the fluid that pressurizes the cuff to move from the cuff to the pressure-regulating balloon. **(See Figure 2)**

The cuff opens and the urine passes through the urethra. The cuff is then automatically repressurized by fluid moving back from the balloon through the pump, thus closing the urethra within minutes.

The occlusive cuff implanted at the bladder neck closes the urethra by applying pressure circumferentially. A connector links the cuff's tubing with tubing from the control pump. The pressure-regu-

lating balloon, implanted in the prevesical space, controls the amount of pressure exerted by the occlusive cuff. The surgeon usually selects the lowest pressure needed to maintain closure of the bladder neck.

The control pump is implanted in the soft tissue of the scrotum or labium. The upper part of the pump contains the resistor and valves needed to transfer the fluid to and from the cuff. The bottom half of the control pump is a bulb which the patient squeezes to transfer fluid within the device.

Patient selection

The AUS is considered for patients with socially incapacitating incontinence which has not responded to more conservative measures, for example:

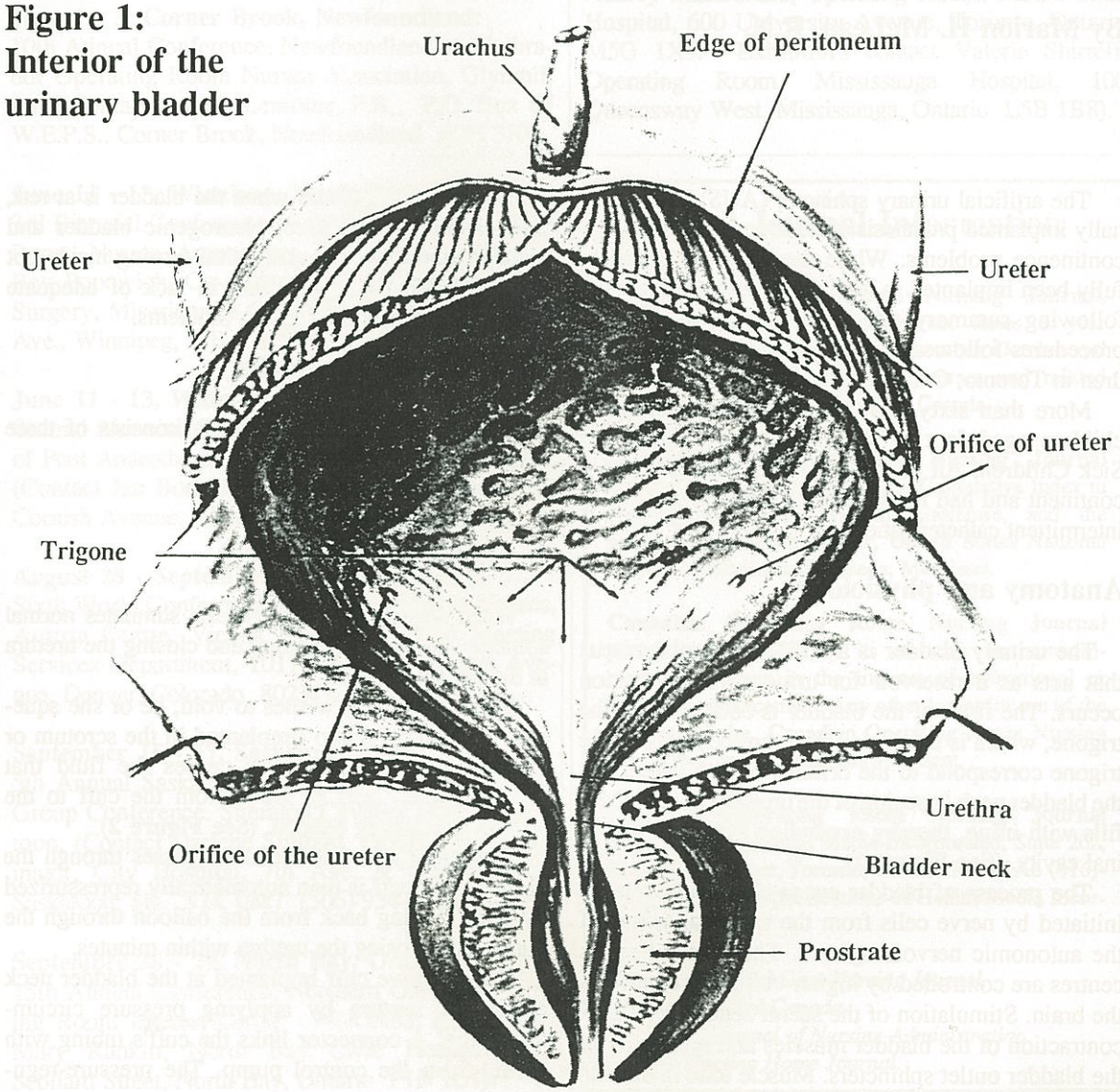
- intermittent catheterization
- the use of anticholineric agents to control hyperreflexia and improve functional bladder capacity as well as storage capacities; and
- other surgical procedures

Previous surgery

Previous surgical procedures may have included bowel augmentation to increase the capacity and compliance of the bladder or a combination of bladder neck reconstruction and vesicourethral suspension to improve bladder outlet resistance. Also, there must be viable tissue at the cuff site for successful implantation of the AUS.

The patient and family must be well motivated, cooperative and compliant. The child has to demonstrate an ability to empty the bladder completely or

Figure 1: Interior of the urinary bladder



be trained in the use of intermittent catheterization.

At the Hospital for Sick Children, prospective implantees are interviewed by a surgeon, staff of the Urodynamic Department and a nurse from urology. The head nurse on the urology ward has developed a thorough teaching program, both pre-operatively and post-operatively, for the children and parents.

Surgical intervention

Pre-operatively, the patient is placed on a bowel routine to empty the rectum. Prophylactic antibiotics are given pre-operatively (and for five days post-operatively). Meticulous precautions are taken to provide a dust-free and lint-free atmosphere in order to avoid blockage by debris of the flow resistors in the control assemby. Instruments and basin sets are wrapped in paper; the surgical team wears paper gowns and hats; tables are draped with paper drapes, with a U-shaped paper patient drape used.

A separate lint-free, high stand is prepared with instruments which have been rinsed twice in sterile water. This high stand is covered until the device is assembled. The tips of forceps are covered with silicone to prevent damage when handling components of the device. Also, "Do Not Enter" signs are placed on doors leading into the operating room in order to reduce traffic flow.

The patient is positioned supinely in a slightly "frog-legged" manner and prepped from nipple line to knees, including perineal area and vaginal prep for female patients.

Surgical Procedure

A Pfannenstiel incision is made through skin, subcutaneous tissue, and muscle. The muscle is divided longitudinally at the midline and dissected from the peritoneum. A Dennis Brown ring retractor is used for retraction. The obliterated umbilical vessels are tied and cut, and cautery is used to incise the bladder and the urine is suctioned out.

The bladder neck is dissected, and a cuff sizer is passed around the bladder neck to determine the exact cuff size. The bladder is sutured closed in three layers. The permanent cuff is passed around the bladder

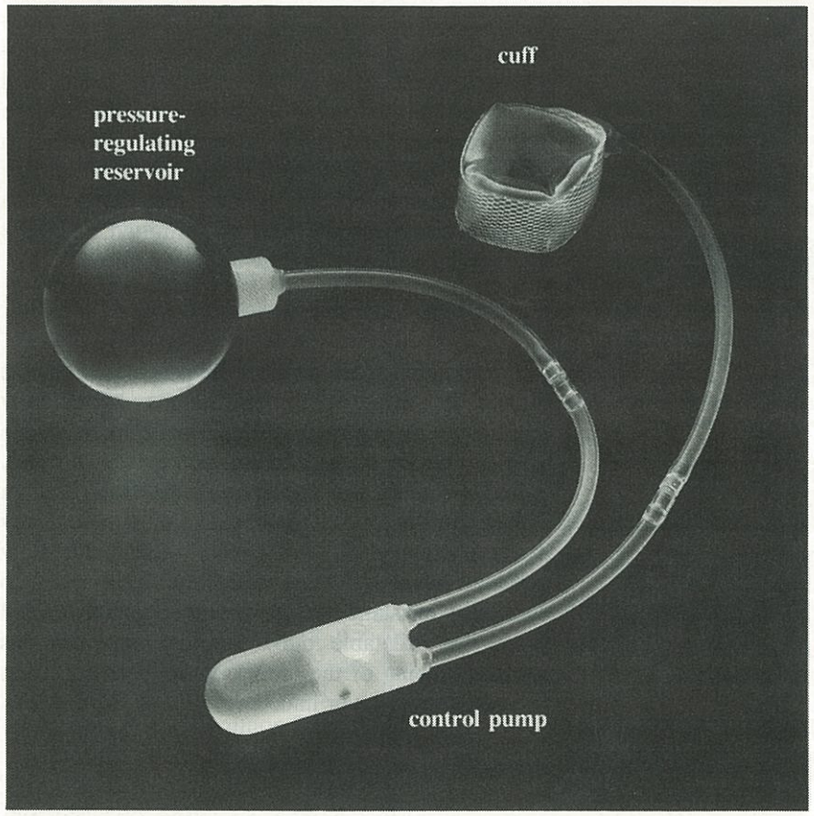
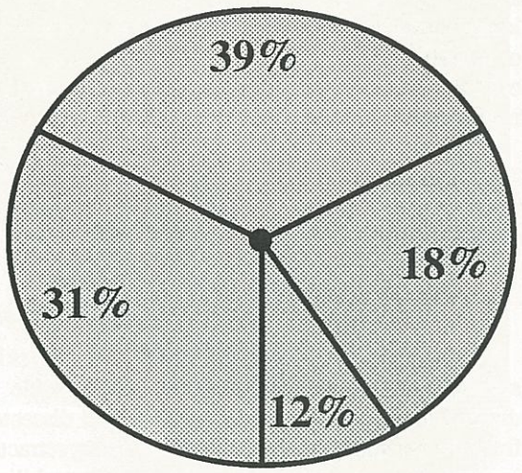


Figure 2: Artificial Urinary sphincter implant

When implanted, the prosthesis (consisting of a control pump, an occlusive cuff, a pressure-regulating balloon or reservoir and connecting (tubing) simulates normal spincter function by opening and closing the urethra at the control of the patient.

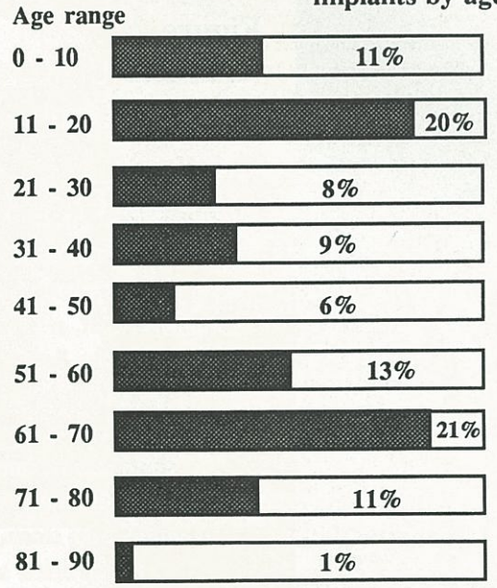


Urinary sphincter implants by cause of urinary incontinence

39%	Urinary tract or prostrate surgery
31%	Birth defects
18%	Spinal cord or pelvic injury
12%	Neurologic dysfunctions/other

Source AMS - Pfizer Hospital Products, Guelph, Ontario

Percentage of artificial urinary implants by age



neck and the ends of the cuff are sutured in place. The peritoneum is opened in the upper quadrant and an angled tubing passer is used to pass the tubing and balloon into the peritoneal cavity. The balloon is left in place and the peritoneum is closed. A deep pocket is created in the labium or scrotum, using Hegar dilators, to receive the pump.

Before the instruments in the lint-free high stand are used for testing and connection of components, the members of the team double-wash their gloves to remove all blood and debris. A large plastic aperture drape is placed over the operative area. The AUS is filled with a contrast medium and the intra-operative pressure measurements are performed before assembly, prior to implantation, and are repeated after the sphincter is in place. The urethral occlusion pressure is monitored intra-operatively.

The connective tubing is trimmed to fit the patient, to avoid kinking, and connections are made. The lint-free tray of instruments is removed from the field and kept sterile. The wound is irrigated with an antibiotic solution and closed in the routine method. A foly catheter is inserted into the urethra. Finally, the abdomen is X-rayed to confirm the absence of kinks in the tubing and the correct position of the cuff, balloon and pump.

Post-operative care

After surgery, patients are taught to pump the sphincter and intermittent catheterization is introduced with accurate charting of residuals. Urodynamic testing is done on a daily basis, and ultrasound is performed to check for residual urine after voiding. An X-ray is taken before discharge to check for kinking or other dysfunction of the urinary implant device. For six months after surgery, no sports or strenuous activities are permitted, and there is a regular routine of follow-up appointments.

Complications

Prior to having the surgery, the patient and parents should be aware of complications which may necessitate the removal of the implant. Leaks in the cuff or balloon occur in a low percentage of cases. Blood or debris that contaminate the fluid used in filling the device at the time of implantation may become trapped in the check valves and flow resistors of the control assembly. This leads to increased resistance to the passage of fluid to and from the inflatable cuff. Surgical complications include kinking of the tubing, inadequate occlusion pressures, erosions or infection.

Results and conclusion

Between 1980 and 1984, forty-four patients had an AUS implanted at the Hospital For Sick Children in Toronto. Ninety percent have been rendered socially continent. Of these, 63 percent are completely dry, and 27 percent have achieved satisfactory continence with only minor damp episodes. In 70 percent of the patients, good or satisfactory continence was achieved without a single revision. Continence was achieved in another 10 percent following a single revision and 10 percent required multiple revisions to attain satisfactory continence.

Improvements in the design of the urinary sphincter implants have resulted in better results with the device. The change in self-esteem of children with an AUS is remarkable. Not having to wear diapers any longer helps them to feel more "normal." Plus, they increase activities, socialize more and become more independent. ■

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About the author

Marion H. McLean is a staff member, Surgical Unit, Urology Department, Hospital for Sick Children, Toronto, Ontario. She is a graduate of both the Registered Nursing Program and Post-graduate Operating Room Course, Humber College, Toronto.