

A Tribute to Nils G. Kock, 1924–2011

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Nils Kock was born in Jakobstad, Finland. He graduated in 1951 from the University of Helsinki Medical School and began his surgical residency in Finland, but then spent 5 years in surgical training at the University of Gothenburg in Sweden, the institution with which he remained affiliated for his entire professional career. In 1959, he obtained his PhD from that university and assumed the position of Assistant Professor of Surgery. There followed a series of promotions, culminating in his appointment as Professor of Surgery in Gothenburg and Chairman of the Department of Surgery at Sahlgrenska University Hospital. In the 1960s, Dr. Kock became interested in developing a continent bladder using a reservoir made of the small intestine. There followed many experiments in canine and feline models, but in 1969, his highly elegant clinical investigations led to the development and the seminal manuscript on the intra-abdominal reservoir as an alternative to conventional ileostomy.

Nils Kock was an exceptionally creative individual. He dedicated his surgical life to the betterment of individuals who required stomas for excretory purposes. As mentioned, his early studies were mainly concentrated on the physiologic workings of the small intestine. I would imagine that he had, in his mind, at a very early stage, the development of urinary or fecal reservoirs, whereby the manipulation of the small intestine in certain ways would negate the unidirectional propulsion of the urinary or fecal streams to produce the effect of continence. His animal model experimentation in the 1960s concentrated on mechanisms engaged in reflex inhibition of the intestine, rhythmic activity of the human bladder, gastrointestinal pacing and the study of drugs to effect the inhibition of intestinal motility. He culminated some of these studies with the Kock pouch or continent ileostomy. Initially the Kock pouch was not created with any type of valve mechanism. The outlet of the pouch was brought out through the rectus muscle on an acute angle to try to prevent incontinence. As we all know, Dr. Kock's work in the 1960s and the 1970s led to a flurry of activity worldwide to learn and establish the basic technique of the Kock pouch. His work has to be considered as the forerunner to the pelvic pouch. The advantages of the Kock pouch are well known. The main advantage, of course, is to provide the individual with an appliance-free lifestyle, while providing complete continence. Unfortunately, complete continence was difficult to achieve despite the many modifications of the Kock pouch. Some of these modifications included the creation of a nipple valve to provide a pressure mechanism within the Kock pouch to prevent incontinence. Dr. Kock's work in the 1970s concentrated on ways to stabilize the valve. Some of these modifications included a fascial or mesh sling around the pouch to prevent slippage of the nipple valve and various modifications of stapling of the valve to the pouch wall. Despite this, slippage of the valve and revisionary surgery was required in up to 40% of patients.

During the 1970s and 1980s considerable physiologic research was undertaken by Dr. Kock and his colleagues. In particular, studies of bacteriology and its relation to inflammation; the identification of pouchitis in Kock pouches created for fecal diversion; absorption in the Kock pouch; the functional and structural definition of the mucosa in Kock pouches; and mucosal morphology,

bacteriology and histochemistry are only some of the physiologic studies that were first documented on the topic of Kock pouches. These studies have subsequently been cited in research on the pelvic pouch. Dr. Kock showed that the quality of life could be substantially improved with a well-functioning Kock pouch for fecal diversion, and to my knowledge there are no studies showing that a well-functioning pelvic pouch increases quality of life more than a well-functioning Kock pouch.

As mentioned previously, Nils Kock's early work was in the development of continent urinary bladders. His work after 1985 was mainly on the development of continent urostomies and a repeat of all the physiologic studies on the fecal diversion Kock pouch. He then went on to use the urethral Kock pouch after cystoprostatectomy, a technique that was described in another seminal paper entitled, "Cystectomy + diversion for carcinoma of the bilharzial bladder."¹ For many years, he collaborated with Professor Mohamed Ghoneim from the University of Mansoura in Egypt to develop techniques in Third World countries where bilharzial disease was prevalent.

Nils Kock died quietly in his sleep on August 24, 2011, at his home in Gothenburg, Sweden.

My first contact with Nils Kock was in 1976. I visited him in Sweden during my fellowship at St. Mark's Hospital in London, England. Over the subsequent 4 years, I had the opportunity to visit him on 3 separate occasions for 2- to 3-week periods to learn the techniques related to the Kock pouch and the management and surgical options available for associated complications. Over the years, I remained in very close contact with Nils owing to our mutual interests. He visited the Department of Surgery at the University of Toronto on several occasions, and I was able to get to know him on a very personal level. He was an amazing individual. He was kind, clever, committed and creative. I had a great deal of admiration and respect for the man himself in addition to his worldwide surgical

impact. In addition, I have been given the opportunity to modify and work with the Kock pouch procedure at the University of Toronto. The development of the Kock pouch and the pelvic pouch, and the general experience that I have had with patients with inflammatory bowel disease has been exciting and challenging. Nils Kock has played an essential role in any success that I have had during my surgical career.

I have been fortunate to have had considerable experience with patients with Kock pouches. Between 1976 and 2006, 194 patients have had a Kock pouch constructed by Robin McLeod and me at the Toronto General and Mount Sinai Hospitals. A total of 141 (77.5%) patients experienced 282 complications: 147 (80.8%) patients required further surgery (mean no. of surgeries 2.18, range 1-8). Valve slippage occurred in 72 (39.6%) patients, peristomal fistula/abscess in 44 (24.2%) and valve prolapse in 20 (11.0%). In total, 55 (30.2%) patients had their Kock pouches excised. The likelihood of having a functioning Kock pouch at 1 year was 95%, at 5 years 85%, at 10 years 80% and at 20 years 69%. Thus, despite a high risk of complications and need for further surgery, a large proportion of patients have a well-functioning Kock pouch at long-term follow-up. The Kock pouch procedure is intriguing and complex. Its use in 2011 is mainly for patients who wish to be converted from a conventional ileostomy to a Kock pouch or following the failure of a pelvic pouch.

It gives me a great deal of pleasure to have written this short but heartfelt editorial on Nils Kock. Nils Kock the surgeon, the researcher, the person and the humanitarian will be missed by all who knew him.

Competing interests: None declared.

Reference

1. Ghoneim MA, Adhmallah AK, Awaad HK, et al. Cystectomy + diversion for carcinoma of the bilharzial bladder. *Prog Clin Biol Res* 1988;260:315-9.