JOURNAL OF ENGINEERING annals OF FACULTY OF ENGINEERING HUNEDOARA

NEONATAL SURGERY IN SZEGED, HUNGARY

Tamás MILASSIN, Laszlo JUHASZ, Szabolcs TORNYOS, Sandor TURI

Department of Pediatrics, University of Szeged, HUNGARY

Abstract

Our clinic is a tertiary level center. We provide surgical service of almost every kind for the four south-eastern counties of Hungary. Furthermore we have increasing numbers of patients from the neighboring regions of Romania and Serbia.

We perform general surgery (thoracic, abdominal surgery, including tumors), urology, traumatology and neonatal surgery. We also care for patients in limited fields of orthopedics, neurosurgery, bronchology and plastic surgery. Recently we have a trend toward performing minimally invasive surgery.

Within neonatal surgery we operate on babies having congenital malformations or acquired diseases for example of the digestive, inspiratory or genitourinary systems. Sometimes we treat exceptionally rare cases, like conjoined twins.

We would like to demonstrate our comprehensive activities. We also encourage all our colleagues in the region to feel free to ask our help, should they encounter a complicated case.

The Pediatric Clinic of the University of Szeged is a tertiary medical center. The Department of Pediatric Surgery provides surgical service for the four south-eastern counties in Hungary. We have patients of all ages from birth to adolescence. Occasionally children are referred to us from remote areas of the country, even from abroad, mostly from the neighboring regions of Romania and Serbia.

We perform general surgery (thoracic, abdominal surgery, including tumors), urology, traumatology and neonatal surgery. We also care for patients in limited fields of orthopedics, neurosurgery, bronchology and plastic surgery. Recently we have a trend toward performing minimally invasive surgery.

A child is a unique surgical patient who is physically and physiologically different from an adult. The differences between children and adults are most marked immediately after birth, when the infant is adapting to extrauterine life. Being one of the four medical universities in Hungary, we are capable of managing almost every possible surgical problem in the newborn. Modern diagnostic modalities are available, including measuring laboratory parameters of body fluids, various radiological techniques like ultrasound, X-ray, computer tomography (CT), magnetic resonance imaging (MR), prenatal ultrasound, prenatal MR.

We have around the clock neonatal transport service, an ambulance car with experienced staff and modern equipment is practically a moving intensive care unit. Yet, it is important to emphasize the importance of prenatal diagnosis of congenital anomalies and planned delivery in a tertiary center. As we use to say: the best possible transportation for a sick infant is in the mother's womb.

Surgical problems in the neonatal period can be congenital or acquired, and can require immediate medical attention or leave time to the medical team to plan the treatment. There are congenital diseases when surgery plays no role, like in anencephaly, which means the newborn has no brain at all, that is incompatible with life. In other cases, the infant suffers from complex anomalies, affecting multiple organ systems, and has poor chances in life expectancy or quality of life, despite multiple surgeries. Some diseases are diagnosed shortly after birth but operation is done later, like inguinal hernia, undescended testis, cleft lip and palate or hypospadias. In this lecture, we concentrate on classic neonatal surgical diseases, which are surgically correctable. Heart surgery and neurosurgery may also be necessary in the newborn period, although these complex procedures are available in our university, but not in our department, so they won't be discussed.

Intestinal obstruction is the most common surgical emergency of the newborn. The common sign is vomiting and feeding intolerance, but the onset and severity depends on the level of obstruction.

Newborns with oesophageal atresia usually have a blind ending upper pouch and the distal part of the oesophagus is connected with the trachea (Figure 1). The baby cannot swallow even his/her own saliva, feeding attempts lead to aspiration. During the operation we close the tracheal fistula and reconstruct the continuity of the oesophagus through a few centimeters long incision.

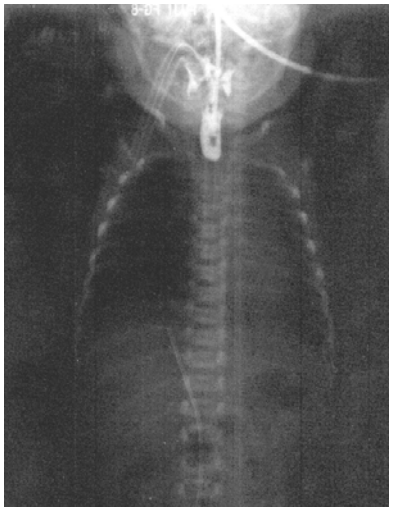

Figure 1: Oesophageal atresia. Note the blind-ending upper pouch

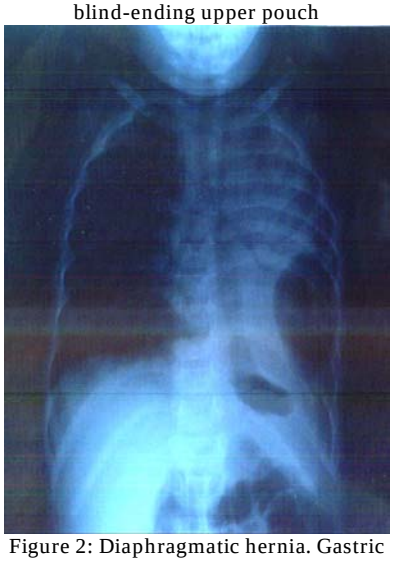

Figure 2: Diaphragmatic hernia. Gastric bubble is in the thoracic cavity

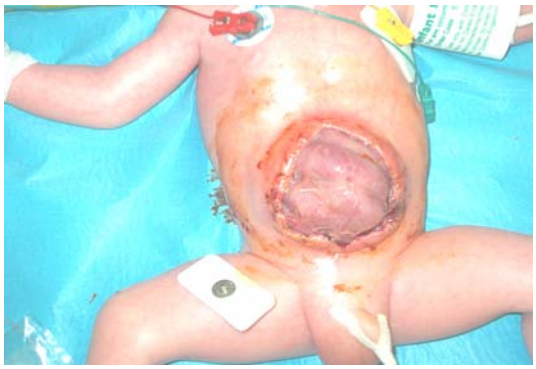

Figure 3:

Duodenal atresia is frequently associated with Down's syndrome. It has characteristic radiographic appearance and nowadays should be diagnosed before birth. There are many different types of the atresia of the small bowel, the operation is performed through laparotomy, and consists of reconstructing the continuity of the intestinal tract. Sometimes a considerably long part of the bowel must be excised.

Less frequently, newborns with malrotation, volvulus, intussusception, intestinal duplications or omphalomesenteric duct remnants need our help.

Many different other diseases, affecting the gastrointestinal system need surgical attention in the newborn, e.g. cystic fibrosis, colonic atresia, anorectal malformations, Hirschsprung-disease. Most of these patients need a palliative colostomy first, the definitive operation can be performed later in life.

Babies with diaphragmatic hernia are born with a hole in their diaphragm, therefore most of the abdominal organs are pushed up into the thoracic cavity, causing impaired development of the lungs (Figure 2). After birth severe pulmonary insufficiency develops and, without complex medical support, the babies die. The operation consists of placing the organs back to the abdomen and closing the diaphragmatic defect.

Discovering severe central nervous system malformations before birth, like meningomyelocele, termination of the pregnancy is offered to the parents, because babies with these anomalies are going to have short and miserable life. Depending on the level of the lesion various symptoms develop, including lower extremity palsy, loss of bladder and bowel control, severe skeletal deformities and hydrocephalus. Should a baby is born with meningomyelocele, the spinal cord must be covered urgently to prevent further injury.

Defects of the abdominal wall, like gastroschisis and omphalocele, not only are severe conditions by themselves, they often combine with other congenital anomalies. Putting back the organs into the abdomen and closing the defect can be extremely challenging (Figure 3).

Various urological anomalies might need surgery in the newborn period to save the affected kidneys from further impairment, e.g. pyeloureteral or ureterovesical stenoses, ureterocele, posterior urethral valve. Different surgical procedures might be needed, from ultrasound-guided percutaneous drainage through ureterostomy to pyelonplasty.

Sometimes, diseases of the gonads require surgical attention. Large ovarian cysts are predisposed to torsion, which stops the blood supply of the organ. Testicles can also undergo torsion. Without operation, the gonads can suffer irreversible necrosis within a few hours. Inguinal hernias can also become incarcerated in the neonate.

Birth injuries can occur at any delivery, but are more frequent during hard labor, breech delivery or in emergency situations, such as bleeding. The injured newborn has significant healing capacity; it is particularly true for the injuries of the musculoskeletal system, while other injuries affecting the nervous system, abdominal or thoracic organs can even be lethal.

We also encounter and operate rare congenital malformations, like biliary atresia, choledochal cysts, cystic adenomatoid malformation of the lungs, congenital lobar emphysema. Various tumors can occur in the newborn, giant sacrococcygeal teratomas for example can actually weigh more than the baby. Sometimes we treat exceptionally rare cases, like conjoined twins.

Hopefully this short lecture has given insight to our comprehensive activities. We would like to encourage all our colleagues in the region to feel free to ask our help, should they encounter a complicated case.