

Department of Surgery

Division of Pediatric Surgery and Vascular Surgery

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General Summary

Pediatric Surgery

Surgery for children at The Jikei University Hospital is offered by a highly trained, expert team of pediatric surgical professionals who specialize in the diseases and conditions affecting young people. Our surgeons work exclusively with infants, children, and adolescents and understand their unique needs.

Vascular Surgery

Research projects of our department have focused on the development of the endovascular repair of aneurysms, the treatment of peripheral arterial disease with new techniques.

Research Activities

Pediatric Surgery

1. Education

Education for medical students: Children undergoing surgery often have congenital anomalies. Lectures in pediatric surgery for students are based on embryology.

Education for training physicians: Three objectives for training physicians in pediatric surgery are: 1) learning how to obtain blood samples from pediatric patients, 2) understanding fluid therapy for pediatric patients, and 3) learning how to bury sutures.

Education for surgical residents: Residents are able to act as lead surgeons or assistants during pediatric surgery.

2. Clinical study

1) Minimally invasive and scarless surgeries

(1) Endoscopic treatment for vesicoureteral reflux using Deflux®

There are 3 options for managing or treating vesicoureteral reflux. We select treatment with Deflux® (Oceana Therapeutics, Ltd., Dublin, Ireland), an injectable dextranomer/hyaluronic acid copolymer. Treatment was successful in 2 of 3 cases.

(2) Laparoscopic percutaneous extraperitoneal closure for inguinal hernia: The learning curve for attending surgeons and residents

Laparoscopic percutaneous extraperitoneal closure for pediatric inguinal hernia is a simple technique in which a purse-string suture made of nonabsorbable material is placed extraperitoneally around the hernia orifice by means of a special suture needle (Lapa-Her-Closure™, Hakko Co., Ltd., Medical Device Division, Chikuma, Nagano, Japan). Concerns have been raised about the extensive learning curve for both attending surgeons

and residents to master this technique. This study assessed the difference in learning curves for the safe performance of laparoscopic percutaneous extraperitoneal closure by attending surgeons and residents.

(3) The Nuss procedure for treating pectus excavatum aims to force the sternum forward and hold it in place with an implanted steel bar without requiring a large incision to resect the abnormal cartilage. In this procedure, the curved steel bar is placed under the sternum through 2 small incisions on the sides of the chest. The number of patients with pectus excavatum treated surgically in our department is the third highest in Japan.

3. Basic study

(1) MicroRNAs transported by exosomes in body fluids as mediators of intercellular communication in human neuroblastoma

Cancer-cell communication is an important and complex process, achieved through a diversity of mechanisms that allows tumor cells to mold and influence their environment. Accumulating evidence indicates that cells communicate via the release and delivery of microRNAs packed into tumor-released exosomes. Understanding the role and mode of action of microRNAs from tumor-released exosomes is of paramount importance in the field of cancer biomarker discovery and for the development of new biomedical applications for cancer therapeutics.

A presentation entitled “A New Index for additional superior bar in Precuts Excavatum’s Nuss Procedure” and authored by Shinsuke Ohashi, Shuichi Ashizuka, Joji Yoshizawa, Masashi Kurobe, and Takao Ohki was given at the 47th annual meeting of the Pacific Association of Pediatric Surgeons in Banff, Canada, in May 2014.

Vascular Surgery

1. Development of endovascular repair of thoracoabdominal aneurysms

Although stent grafts for the treatment of abdominal aortic aneurysms (AAAs) have been developed and are commercially available, no such stent grafts are available for the treatment of thoracoabdominal aortic aneurysms (TAAAs) in Japan. The surgical mortality rate following open surgery for the treatment of AAAs is satisfactory, but that for the treatment of TAAAs remains unacceptably high at 15% to 20%, and further improvement is desperately needed. Because a TAAA involves 1 or more visceral arteries, visceral perfusion must be maintained while the aneurysm is excluded with stent grafts. We have used a custom-made t-Branch stent graft in combination with covered stents (for visceral reconstruction) for the treatment of TAAAs that were considered inoperable because of comorbid conditions or a hostile thorax/abdomen. Although stent graft repair for TAAAs requires long operative and fluoroscopic times, this treatment is feasible and safe.

2. Development of endovascular repair of aortic arch aneurysms: Retrograde in-situ branched surgery and branched thoracic arch stent grafts

We have developed a new minimally invasive operation for aortic arch aneurysms. After carotid-carotid bypass surgery, if needed, is performed and stent grafts are placed, a needle is used to prick the stent graft through one side of a carotid artery, after which a covered stent is inserted as a branch and deployed into the stent graft (in an in-situ retrograde fashion). We have examined this retrograde in-situ branched surgery in an

in-vitro study and have applied it clinically. This operation is expected to be a less invasive surgery for aortic arch aneurysms. We also use branched thoracic arch stent grafts that are commercially available in Europe for endovascular repair of aortic arch aneurysms after receiving approval from our institutional review board.

3. Research on drug-eluting stent in the superficial femoral artery

The Zilver PTX drug-eluting peripheral stent (Cook Medical, Bloomington, IN, USA) is specifically designed and approved to treat peripheral arterial disease affecting the superficial femoral artery, the main vessel of the thigh. The Zilver PTX is a self-expanding stent made of nitinol, a space-age “shape memory” metal that offers unique mechanical advantages for a stent in the superficial femoral artery. We participated in a randomized, controlled trial with a global registry; most patients were enrolled in the United States, but some were also enrolled in Germany and Japan. After the trial’s 1-year primary endpoint was reviewed, the Zilver PTX received approval from the Japanese Pharmaceuticals and Medical Devices Agency in January 2012 and is now available in Japan.

Publications

Tanaka K, Hashimoto H, Ohki T. Lactate levels in bowel strangulation with experimental animal model. *Int Surg.* 2015; **100**: 240-3.

Tanaka K, Yoshizawa J, Akiba T. Effective Treatment of thyroglossal duct cysts in young children with OK-432: three case reports and literature review. *Jikeikai Medical Journal.* 2015; **62**: 41-4.

Ohki T, Angle JF, Yokoi H, Jaff MR, Popma J, Piegari G, Kanaoka Y; OSPREY investigators.

One-year outcomes of the U.S. and Japanese regulatory trial of the Misago stent for treatment of superficial femoral artery disease (OSPREY study). *J Vasc Surg.* 2016; **63**: 370-6.e1.

Maeda K, Kanaoka Y, Ohki T, Sumi M, Toya N, Fujita T. Better clinical practice could overcome patient-related risk factors of vascular site infections. *J Endovasc Ther.* 2015; **22**: 640-6.

Maeda K, Ohki T, Kanaoka Y, Toya N, Baba T, Hara M, Hagiwara S. Current surgical management of abdominal aortic aneurysm with concomitant malignancy in endovascular era. *Surg Today.* 2016; **46**: 985-94. Epub 2015 Oct 15.

Baba T, Ohki T, Kanaoka Y, Maeda K. Clinical outcomes of left subclavian artery coverage on morbidity and mortality during thoracic endovas-

cular aortic repair for distal arch aneurysms. *World J Surg.* 2015; **39**: 2812-22.

Ito E, Kanaoka Y, Maeda K, Ohta H, Ishida A, Ohki T. Deployment accuracy of the conformable GORE® TAG® thoracic endoprosthesis in the treatment of zones 2 and 3 aortic arch aneurysms compared with the previous TAG®. *Ann Vasc Dis.* 2015; **8**: 74-8.

Reviews and Books

Shukuzawa K, Toya N, Fukushima S, Momose M, Akiba T, Ohki T. Surgical Treatment of a giant right hepatic aneurysm with an aberrant left hepatic artery: report of a case. *Ann Vasc Dis.* 2015; **8**: 271-3.

Ito E, Ohdaira H, Yasuda J, Yoshida M, Suzuki Y. A case of mediastinal goiter treated surgically using a clavicle-lifting technique. *Int J Surg Case Rep.* 2015; **16**: 12-4.

Ito E, Ohdaira H, Suzuki N, Yoshida M, Suzuki Y. Percutaneous endoscopic sigmoidopexy for sigmoid volvulus: a case report. *Int J Surg Case Rep.* 2015; **17**: 19-22.