Abstract of research papers

Low-Exposure and High-Speed Scanning of a Pediatric Cancer Patient Using 320-Row Area Detector CT

Makoto Mihara, Yohei Hayshi, Hisashi Moriguchi, Hisako Hara, Takumi Yamamoto,
Rintaro Hirai, Mitsunaga Narushima, Isao Koshima, Masahiro Sato

Computed tomography (CT) is a common diagnostic imaging technique. In plastic and reconstructive surgery, preoperative CT is used to identify the positions of vessels accurately, and this is especially useful in supermicrosurgery requiring anastomosis of capillary vessels. However, CT is difficult to perform for pediatric patients due to X-ray exposure and the need for administration of sedative agents. These problems have been partly resolved by shortening of the scanning time with development of multi-detector CT (MDCT) and the introduction of 320-row area detector CT (ADCT) in 2008. In this study, we describe a case of pediatric malignant rhabdoid tumor in which we diagnosed the tumor invasion and planned the anastomosis of vessels using head scanning with ADCT. Using this case as an example, we also discuss the importance of development of ADCT for health professionals and patients.

Performance of Supermicrosurgery using a Titanium Needle Holder

Makoto Mihara, Yohei Hayshi, Hisashi Moriguchi, Takumi Yamamoto, Mitsunaga Narushima, Azusa Oshima, Mikiko Imamura, Jun Araki, Takuya Iida, Gentaro Uchida, Isao Koshima, Noriaki Emi

Development of the supermicrosuture has enabled performance of supermicrosurgery in which microvessels smaller than 0.5 mm in diameter are anastomosed. This surgery has also been facilitated by advances in peripheral equipment, including a needle holder, for accurate handling of the supermicrosuture. However, there are several problems with the stainless steel needle holder, including weight, magnetism and stylized shape, and a new type of needle holder is needed for resolution of these problems. In this context, the EMI Factory Co. used titanium to develop a light, nonmagnetic and convertible needle holder. In this study, we describe a case of pediatric fingertip replantation and we discuss the potential for production of surgical equipment based on a surgical plan, through development of order-specific medical instruments. We suggest that this approach will require close coordination between the medical and industrial fields.

Prevention of Surgical Site Infection in Pediatric Reconstructive Surgery under Bone Marrow Suppression

Yohei Hayshi, Makoto Mihara, Takuya Iida, Hisashi Moriguchi, Rintaro Hirai,
Azusa Oshima, Mitsunaga Narushima, Isao Koshima

Surgical site infection (SSI) is the most common infection following a surgical procedure and reduction of SSI is an important issue for health professionals and patients. In particular, SSI may develop into a serious infection in cancer patients with decreased white blood cell counts due to chemotherapy and in pediatric patients with a weak immune system. Because SSI often occurs through sutures used in surgery that remain in the body, improvement of sutures has been used as a countermeasure against SSI. In 2003, the introduction of a suture containing an antibacterial agent opened a new avenue to prevention of SSI. In this study, we report a case of pediatric malignant rhabdoid tumor in which head reconstructive surgery was performed using the antibacterial suture with successful control of infectious diseases. We also provide an overview of the current situation and perspectives on prevention of SSI.