THE USEFULNESS OF THREE-DIMENSIONAL COMPUTED TOMOGRAPHY SIMULATION FOR PORT-ACCESS THORACOSCOPIC SURGERY IN CHILDREN AND ADOLESCENTS

Second Department of Surgery, Yamagata University, Yamagata, Japan

Objectives: Recently, minimally invasive surgery has been in demand, particularly for children and adolescents. Although thoracoscopic surgery (TS) is useful for minimally invasive surgery, it is difficult and sometimes requires additional thoracotomy because the thoracic cavity is very small in children. Three-dimensional computed tomography simulation (3DCTS) is reportedly useful in adult TS. We introduced 3DCTS in July 2009 to evaluate its usefulness in children and adolescents.

Methods: Between July 1994 and February 2013, 25 patients (<20 years of age) underwent TS. 3DCTS is comprised of 3DCT angiography (3DCTA) with or without bronchography, pleurography (PLG), and image overlay (IO). We evaluated TS-accomplishment before and after the introduction of 3DCTS, respectively.

Results: The numbers of patients before and after the introduction of 3DCTS were, respectively, 6 and 3 with metastatic lung tumours (MLT), 4 and 3 with congenital anomalies (CA) including cystic adenomatoid malformation, bronchial atresia and pulmonary sequestration, 1 and 3 with benign tumours (BT), 1 and 2 with mediastinal tumours (MT), and 1 and 1 with pyothorax (P). Port-access TS using 3DCTS was performed in 12 cases (MLT 3, CA 3, BT 3, MT 2, P 1). 3DCTA was used for all of the CAs, and PLG was used for 2 MLTs. IO was used to decide port sites. The ratio of TS-accomplishment was 62% (5 cases needed additional thoracotomy) before 3DCTS and 100% after the introduction of 3DCTS (P < 0.05).

Conclusions: 3DCTS was very useful and enabled the safe performance of port-access TS for minimally invasive surgery in children and adolescents.