



# Establishment of multi-center database on thymic epithelial tumors (TETs) and current situation in Korea

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**Abstract:** The Korean Association for Research on the Thymus (KART) was established in January 2014 with the following members: Asan Medical Center, Samsung Seoul hospital, Seoul national university hospital and Severance hospital, known to be the top four hospitals with the most amount of surgical cases on thymic epithelial tumor (TET). The aim of KART is to establish a multi-center TET database and present the clinical features and treatment outcomes in Korea. The KART database which was based on the International Thymic Malignancy Interest Group (ITMIG) database system included 1,462 cases of retrospectively collected thymoma and thymic carcinoma from Jan 2000 to Dec 2013. Masaoka-Koga stage I consisted of 34%, stage IIA 22% and stage IIB 17%. The overall 5- and 10-year survival rates were 90% and 76% respectively. As the Masaoka-Koga stage progressed, the survival rates decreased. Through the collaboration of ITMIG, 1,327 cases from KART were registered in the database of Cancer Research And Biostatistics (CRAB) in 2019. The Korean Association for Thoracic Surgical Oncology (KATSO) is the only organization in which all thoracic surgeons in South Korea are registered. Because KART was established with the purpose of collecting data on a national scale, KART is in collaboration to produce a nationwide database system with KATSO. The new database system is planning to collaborate with the ITMIG CRAB database and will adopt a TNM staging system developed in parallel to the Masaoka-Koga system. Data is planned on being collected retrospectively and prospectively and KART data will be the foundation of the retrospective data. Once the KATSO database is fully established, the national data of TET will be used to establish a guideline and standard of the treatment for TET in South Korea and KATSO will collaborate with ITMIG.

**Keywords:** Korea; International Thymic Malignancy Interest Group (ITMIG); KART

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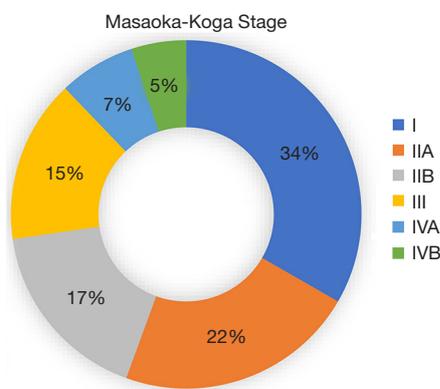
South Korea is a country with a population of 56.5 million over an area similar in size to Hungary. There are 40 colleges of medicine and 10 are located in Seoul, the capital of South Korea. There are 5 major health care facilities and 70 university hospitals in which major thoracic surgery is possible. About 10 hospitals operate on more than 10 cases thymic epithelial tumors (TETs) per year. Currently there are no official statistics on TET. Korean Association for Research on the Thymus (KART) was established in January 2014 with the following members: Asan Medical Center, Samsung Seoul hospital, Seoul national university hospital

and Severance hospital, known to be the top four hospitals with the most amount of surgical cases on TET. The aim of KART is to establish a multi-center database of TET and present the clinical features and treatment outcomes of TET in Korea. The KART database was based on the International Thymic Malignancy Interest Group (ITMIG) database system for retrospective data collection and comprises 313 fields. There were 1,462 cases of thymoma and thymic carcinoma which were collected retrospectively from Jan 2000 to Dec 2013. The male to female ratio was 783:679; mean age 51.5±12.9. The average size of the TET

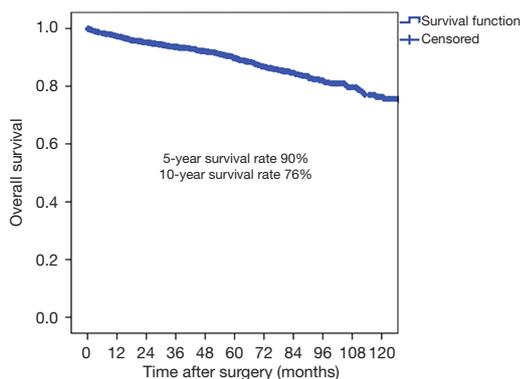
**Table 1** Postoperative outcomes of patients with thymoma

Outcome parameters	N
Mortality	5 (0.3%)
ICU admission	168 (12.0%)
Transfusion	117 (8.0%)
C-tube duration (days)	4.1±2.7
Length of hospital stay (days)	8.6±10.5
Postoperative complications <sup>†</sup>	149 (12.7%)
Grade I	53 (4.5%)
Grade II	49 (4.2%)
Grade III	34 (2.9%)
Grade IV	13 (1.1%)

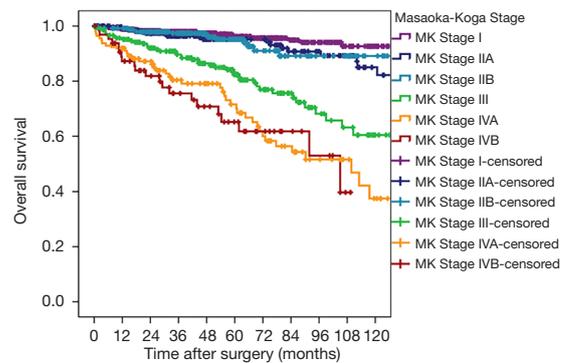
<sup>†</sup>, Clavien-Dindo classification grades.



**Figure 1** Masaoka-Koga stage.



**Figure 2** Overall survival of patients with thymoma.



**Figure 3** Survival by Masaoka-Koga stage.

was 6.1±3.1 cm and myasthenia gravis coexisted in 317 patients. Thymoma was 80% and thymic carcinoma was 19%. In the surgical approach, sternotomy or thoracotomy consisted of 62% and video-assisted thoracic surgery (VATS) or robot-assisted thoracic surgery (RATS) 35%. However, with the increase in minimally invasive surgery (MIS) starting from 2008, more than 50% of the operations are currently minimally invasive. Operations consisted of 90% R0 resections, 8% R1 resections, and 2% R2 resections. The mean hospital stay was 8.6±10.5 days; operative mortality occurred in 5 patients (0.3%) (Table 1). Masaoka-Koga stage I consisted of 34%, stage IIA 22% and stage IIB 17% (Figure 1). The overall 5- and 10-year survival rate were 90% and 76% respectively (Figure 2). As the Masaoka-Koga stage progressed, the survival rates decreased (Figure 3). Among the 1,115 thymoma cases an association with autoimmune disease was present in 311 myasthenia gravis (27.9%), 1 red cell aplasia (0.1%) and 1 Bechet's disease (0.1%). Among the 210 thymic carcinoma patients myasthenia gravis was present in 6 cases (2.9%). Currently, five studies based on the KART database were published in well renowned journals (1-5) and further research is being conducted. Through the collaboration of ITMIG, 1,327 cases from KART were registered in the central database of Cancer Research And Biostatistics (CRAB) in 2019.

To prepare for the 2019 ITMIG conference, individual e-mails were sent to 75 facilities and the numbers of TET operations from 2016 to 2018 were investigated. Data from 28 hospitals including most high-volume centers were collected. The total number of operations performed by the 28 hospitals in 3 years were 1,272 cases of thymoma and 307

cases of thymic carcinoma. The number of cases registered in the KART was 745 cases of thymoma and 197 cases of thymic carcinoma during same period. KART consisted about 60% of the total cases performed. Based on this data, we can estimate that about 1,670 cases of thymoma and 450 cases of thymic carcinoma were performed in 75 hospitals.

Korean Association for Thoracic Surgical Oncology (KATSO) is the only organization in which all thoracic surgeons in South Korea are registered. Because KART was established with the purpose to collect data on a national scale, the organization is collaborating on producing a nationwide database system with KATSO. KATSO is planning to produce a database system which may collaborate with the ITMIG CRAB database. We will adopt a TNM staging system developed in parallel to Masaoka-Koga system. Data is planned on being collected retrospectively and prospectively and KART data will be the foundation of the retrospective data. The downfall is that financial investments will be needed to produce and sustain this database. Once the KATSO database is fully established, the national data of TET in South Korea will produce results needed to establish a guideline and standard of the treatment for TET. Also KATSO will provide data for domestic research and collaborate with ITMIG to aid in the forming of a worldwide database.

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