

Management of database: European Society of Thoracic Surgeons mesothelioma database – difficulties in improving quality data for rare tumour

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Background: Malignant pleural mesothelioma is a rare tumour but very aggressive with a median survival of 6 to 9 months from diagnosis without any treatment, The European Society of Thoracic Surgeons (ESTS) created a dedicated prospective mesothelioma registry to collect data on patients with malignant mesothelioma treated surgically to monitor the quality of surgery performed.

Methods: A dedicated separate registry for mesothelioma has been created as satellite database of the main ESTS database. The database was designed with K data service and was put on line on 2015. Data have been imported retrospectively since 1990 until April 2015 and then 180 cases were also collected also prospectively since 2015.

Results: One thousand and nine hundreds and ninety six cases were collected until April 2017. Most of the patients were male (n=1,403). About 25% received trimodality treatment including surgery and many of them were upstaged to pathological stage III and IV. Only 16 (0.8%) patients in the database died as inpatients. Thirty percent to 40% of patients in the registry had missing information regarding clinical and pathological staging and more than 70% of patients do not have complete information on their multimodality treatment.

Conclusions: The ESTS database represents one of the largest mesothelioma database comprehensive of clinical, surgical and follow up data. The main issue with such an detailed database is the completeness of the data entry, which is crucial to better understand the impact of surgery and monitor the quality of surgery offered across the centres.

Keywords: Malignant pleural mesothelioma; radical surgery; database; outcomes

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Introduction

Malignant pleural mesothelioma is a rare but very aggressive tumour with a median survival of 6 to 9 months from diagnosis without any treatment (1). A significant improvement in survival has been achieved with chemotherapy based on platinum based and pemetrexed (2). The multimodality treatment including surgery (extrapleural pneumonectomy or pleurectomy decortication) reached a median survival of 20 to 24 months in selected patients with limited disease (3-6), but all the evidence is based on retrospective series.

MARS trial so far has been the only prospective randomized controlled trial comparing chemotherapy alone versus multimodality treatment, including extra pleural pneumonectomy. The trial showed no significant advantages of a more aggressive multimodality approach compared to chemotherapy alone (7). Despite being the only randomized controlled trial, the MARS trial has been criticized for his high surgical mortality rate and study design (8).

In the last decade more retrospective data have been published on pleurectomy decortication for mesothelioma, with results similar or superior to extra pleural

pneumonectomy in terms of overall survival with a significant lower postoperative morbidity and mortality.

In order to standardize how the surgical approach is described and make the data more homogeneous at the time of comparison and analysis, Rice et al published a paper on how to define pleurectomy decortication, classified as partial, radical and extended when diaphragm and/or pericardium are resected due to tumour infiltration (9).

Also in order to define a better staging system specific for mesothelioma and collect outcomes of patients with mesothelioma treated with surgery, the International Association for the Study of Lung Cancer created a very detailed dataset to collect mainly surgical and staging data (10).

The European Society of Thoracic Surgeons (ESTS) created a dedicated prospective mesothelioma registry to collect retrospectively and prospectively the data and outcome for patients diagnosed with mesothelioma and treated in Europe.

The aims of this registry are to monitor the quality of surgery performed between the ESTS units involved in this project and to prospectively collect data to better understand the impact of surgery on mesothelioma patients and to collaborate with staging projects.

Methods

A dedicated separate registry for mesothelioma has been created as satellite database of the main ESTS database. This database has been created for accreditation purpose for Thoracic Surgery Unit but also for research purpose and prospective data collection. The database was designed with K data service and was put on line in 2015.

The database has been divided in five sections

- (I) Demographic data;
- (II) Preoperative clinical data: performance status, comorbidities, diagnosis, lung function tests, symptoms at presentation, smoking history, asbestos exposure, staging investigations (computed tomography, positron emission tomography and standardized uptake value, magnetic resonance imaging when indicated);
- (III) Operative data: type of operation (diagnostic or pleurectomy decortication or extrapleural pneumonectomy), length of operation, blood loss, number of blood transfusion, chest structures involved and resected, availability of tissue for research;

- (IV) Postoperative data: sequence of treatment (chemotherapy and or radiotherapy), type of chemotherapy, number of cycles, type of radiotherapy and complications;
- (V) Follow up and outcome: status at discharge, 30-day mortality, presence and site of recurrence, time of recurrence, death and cause of death.

Data have been imported retrospectively since 1990 until April 2015 and then 180 cases were also collected also prospectively since 2015.

Results

One thousand and nine hundreds and ninety six cases were collected until April 2017. Most of the patients were male (n=1,403) and 67% of patients were between 61 to 80 years old. Forty three per cent were staged clinically as early stage, 14 patients were metastatic at the time of presentation; 45.4% of patients were diagnosed with epithelioid mesothelioma. About 25% received trimodality treatment including surgery and many of them were upstaged to pathological stage III and IV. Only 16 (0.8%) patients in the database died as inpatients. Most of the patients were treated with surgery upfront, only 10% of patients received chemotherapy with a neoadjuvant intent. Despite this is a surgical database, patients who only received chemotherapy and or radiotherapy were also included in the registry.

A list of mandatory data fields have been created and reported in *Table 1* with completeness rate. Thirty percent to 40% of patients in the registry had missing information regarding clinical and pathological staging and more than 70% of patients do not have specific information on their multimodality treatment.

Discussion

The ESTS database represents one of the largest dedicated mesothelioma database. The data collected can be used to monitor quality of surgical treatment and clinical outcomes of single unit and compare with the other ESTS units. This comprehensive database can also be used for research purpose and for further staging analysis.

The biggest challenge for such a comprehensive and detailed database is the completeness of the data entry. In order to improve the quality of the database we decided to create mandatory fields. Only cases with all mandatory fields completed will be included in the analysis, this should improve the quality of the database, minimizing the number of control needed and increasing the quality of the data

Table 1 Completeness rate of core data

Name of the field	Unknown (%)	Completeness (%)
cT	42.3	57.7
cN	27.8	72.2
cM	31.7	68.3
Histology	5.0	95.0
pT	44.2	55.8
pN	43.9	56.1
pM	44.3	55.7
Histology at surgery	49.8	50.2
First treatment at sequence	73.6	26.4
Second treatment at sequence	86.3	13.7
Third treatment at sequence	94.8	5.2
Outcome at discharge	20.3	79.7
Outcome at 30 days	29.8	70.2

entered by the single unit.

As previously reported by Rice there is a great variability in how radical surgery for mesothelioma has been described, and a more accurate dataset for radical surgery is the only way to standardize the surgical data (9). The fields in the ESTS database should help in define the extension of the resection and the macroscopic radical resection rate. Surgical descriptors have been introduced to precisely described which structures involved, resected and or reconstructed at the time of surgery.

The lymph node categories for mesothelioma staging derived from the lung cancer staging project, specific fields on lymph node involvement have been created in the ESTS, according to the IASLC recommendation to validate the N descriptors presented in the 8th TNM edition for mesothelioma (11).

The aim of a prospective database with detailed surgical data is to objectively define the extension of the disease at the time of surgery minimizing the variability present in surgical reports. This can help to better understand the extension of the disease at the time of the surgery and help to better define the pathological staging and the resection status.

As previously reported and discussed in mesothelioma surgery the resection status is defined as macroscopic radical resection or incomplete resection and a macroscopic complete resection (R0) has a significant impact on survival

even comparing pleurectomy decortication and extrapleural pneumonectomy (12). Better surgical descriptors can help to understand the impact of R0/R1 *vs.* R2 resection and difference in survival according to the structures involved.

A prospective registry requires a continuous effort from the centres involved in the data collections but offers a good alternative to randomized control trial in comparing different treatments. This registry also includes patients who only had medical treatment, and the importance of collecting prospectively patients who only had medical treatment is to have more objective data when comparing different treatment modalities.

The ESTS is planning to perform a preliminary analysis on short and long term outcomes and to share the surgical data with the IASLC for the next TNM edition to better define clinical and pathological staging. Recently ESTS Database Committee and IASLC have signed a data share agreement in order to share the data for the 9th TNM edition. This collaboration will let our members to introduce the data in the ESTS registry and have their data imported in the IASLC database for staging purpose at the same time. This collaboration should increase the number of data available for staging analysis, increasing the statistical power of the different staging factors.

In conclusion, a prospective database is the most reliable way to collect prospective data to understand how patients presented and how they are treated. The main issue with a detailed database is the quality and completeness of data entry. The engagement and the quality of the data entry are the challenges that every database is facing recently. Dedicated funds for rare disease like mesothelioma are extremely important in the future to help collecting data from different institutions.

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Footnote

Conflicts of Interest: The author has no conflicts of interest to declare.

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