ABSTRACT - Background: The adoption of standardized protocols and specialized multidisciplinary teams for esophagectomy involve changes in routines with the implantation of expensive clinical practices and deviations from ingrained treatment philosophies. Aim: To evaluate the prevalence of standardized protocols and specialized multidisciplinary teams in São Paulo state, Brazil. Methods: Institutions that routinely perform esophagectomies in São Paulo were contacted and questioned about the work team involved in the procedure and the presence of standardized routines in the preoperative care. Results: Fifteen centers answered the questionnaire: 10 (67%) public institutions and five (33%) private. There were seven (47%) medical schools, six (40%) with a residency program and two (13%) nonacademic institutions. The mean number of esophagectomies per year was 23. There was a multidisciplinary preoperative team in nine (60%). There was a multidisciplinary postoperative team in 11 (73%). Early mobilization protocol was adopted in 12 (80%) institutions, early feeding in 13 (87%), routinely epidural in seven (47%), analgesia protocol in seven (47%), hydric restriction in six (40%), early extubation in six (40%), standardized hospitalization time in four (27%) and standardized intensive care time in two (13%). Conclusion: The prevalence of standardized protocols and specialized teams is very low in São Paulo state, Brazil. The presence of specialized surgeons is a reality and standardized protocols related directly to surgeons have higher frequency than those related to other professionals in the multidisciplinary team.
The outcomes for esophageal resection seem to be influenced by the adoption of standardized protocols and specialized multidisciplinary teams.

Esophageal cancer in the state of São Paulo, Brazil is the 6th neoplasia in men, corresponding to 2.7% of all malignancies in the state.

Achalasia secondary to Chagas disease is also a health problem. Although the number of autochthonous cases from São Paulo is small, migration from other areas of the country for treatment is very common. Esophagectomy is one of the therapies proposed for dilated megaesophagus which represents a significant number of the cases.

This study aims to evaluate the prevalence of the implementation of standardized perioperative routines for esophagectomy in the state of São Paulo, Brazil.

**METHODS**

The study was approved by the Institutional Review Board under number 288.432/2013.

Institutions in the State of São Paulo that routinely perform esophagectomy, for benign or malign disease, were contacted and questioned about the team involved in the process and the implementation of standardized perioperative routines.

The selection of the contributors was made considering recent publications in the field, participation in meetings, networks and indication of participants. There is no official registration of esophagectomies in Brazil.

**Questionnaire**

A senior team member were contacted by e-mail or phone, and questioned about: 1) the annual number of esophagectomies performed in the institution; 2) the existence of a specialized surgical team; 3) the presence of a specialized anesthesiologist; 4) the presence of a multidisciplinary pre and postoperative team and its members; 5) the existence of standardized protocols, such as hydric restriction, early extubation, analgesia, routinely epidural, early deambulation, feeding, intensive care time and hospitalization time.

Fisher or Mann-Whitney tests were used when appropriate for statistical analysis and p < 0.050 was considered significant.

**RESULTS**

Seventeen institutions were contacted, 15 (88%) answered the questionnaire. Among those that answered, 10 (67%) were public institutions and 5 (33%) private. There were 7 (47%) medical schools, 6 (40%) institutions with a residency program and 2 (13%) nonacademic institutions.

The mean number of esophagectomies per year was 23±18 (range 5-60) (Figure 1).

Thirteen (87%) institutions had specialized surgical team and four (27%) specialized anesthesiologist.

There was a multidisciplinary pre-operative team in nine (60%) institutions; counting with surgeon in nine (100%) of those with a multidisciplinary team; oncologist in seven (78%), nutritionist in six (67%), physiotherapist in five (56%) anesthesiologist in two (23%), nurse in three (33%), psychologist in two (33%), endoscopist in two (23%), pulmonologist in one (11%), cardiologist in one (11%) and pathologist in one (11%).

There was a multidisciplinary postoperative team in 11 (73%) institutions; counting with surgeon in 11 (100% of those with a multidisciplinary team), oncologist in nine (82%), physiotherapist in eight (73%), nutritionist in seven (64%), radiotherapist in four (36%), nurse in three (30%), psychologist in three (18%), pathologist in two (18%), anesthesiologist in two (18%), endoscopist in one (9%) and audiologist in one (9%).

Early mobilization protocol was adopted in 12 (80%) institutions; early feeding in 13 (87%); routinely epidural in seven (47%); analgesia protocol in seven (47%); hydric restriction in six (40%); early extubation in six (40%); standardized hospitalization time in four (27%) and standardized intensive care time in two (13%).

Table 1 shows the correlation between the number of esophagectomies per year and others variables, and Table 2 the correlation between public and private institutions and other variables. There were no differences between the groups.

**TABLE 1 – Correlation between the number of esophagectomies per year and others variables**

| Esophagectomy/year | 5 to 15 (n=7) | 15 to 25 (n=4) | More than 25 (n=4) | p value |
|--------------------|--------------|---------------|------------------|--------|
| Public             | 57%          | 50%           | 50%              | 1      |
| Hydric restriction | 0%           | 25%           | 100%             | 1      |
| Early extubation   | 28%          | 50%           | 50%              | 1      |
| Analgesia          | 14%          | 75%           | 75%              | 1      |
| Epidural           | 43%          | 50%           | 50%              | 1      |
| Early mobilization | 71%          | 75%           | 100%             | 1      |
| Early feeding      | 71%          | 100%          | 100%             | 1      |
| Surgical team      | 71%          | 100%          | 100%             | 1      |
| Anesthesiologist   | 14%          | 0%            | 75%              | 1      |
| Pre-operative team | 43%          | 75%           | 75%              | 1      |
| Postoperative team | 57%          | 75%           | 100%             | 1      |

**TABLE 2 – Correlation between public and private institutions and other variables**

|                     | Public institutions (N=10) | Private Institutions (N=5) | p value |
|---------------------|---------------------------|---------------------------|--------|
| Surgical team       | 80%                       | 100%                      | 1      |
| Specialized anesthesiologist | 20%              | 40%                       | 0.6027 |
| Pre-operative team  | 50%                       | 80%                       | 0.6785 |
| Postoperative team  | 70%                       | 80%                       | 1      |
| Hydric restriction protocol | 30%              | 60%                       | 0.6311 |
| Early extubation    | 40%                       | 40%                       | 1      |
| Analgesia           | 50%                       | 40%                       | 1      |
| Epidural            | 50%                       | 40%                       | 1      |
| Early mobilization  | 80%                       | 80%                       | 1      |
| Early feeding       | 80%                       | 100%                      | 1      |
| Intensive care time | 10%                       | 20%                       | 1      |
| Hospitalization time| 20%                       | 40%                       | 0.6027 |

**FIGURE 1** - Annual rate of esophagectomy per year for the participant institutions.
DISCUSSION

The outcomes for esophagectomy must not be only measured by mortality and survival. The procedure is also linked to a high rate of morbidity, prolonged ICU and in-hospital time. As mentioned before, the outcomes seem to be influenced by the adoption of multidisciplinary care pathways. However, these results show a low prevalence of implementation of standardized protocols for esophagectomy in the state of São Paulo.

It seems to have a clear direct relation between the volume of esophagectomies and outcomes. The annual rate of procedures probably influences not only surgeon's expertise but also the multidisciplinary team experience. In our results, even though standardized protocols and specialized teams were more prevalent in high volume centers, statistical significance was not reached. This fact may reflect the small number of included institutions. It seems intuitive that the adoption of standardized protocols may be more difficult in low volume centers; however, most available series come from centers reporting results from less than seven esophagectomies/year.6,11,12,15

Even though our report does not evaluate outcomes, the adoption of standardized protocols and multidisciplinary care seems to improve outcomes and thus may be considered an improvement in care, especially in countries with a high prevalence of esophageal cancer and achalasia. Findlay et al.4 recently reviewed the topic and found that five series reported reductions in length of stay; one reported reductions in pulmonary complications, mortality, and length of stay; and two reported reduction in complications overall. The benefits of standardized clinical pathways was confirmed by two metanlysis13,14 and a prospective study.6

There are major difficulties in the introduction of new clinical evidence-based guidelines into clinical practice. Most of the esophagectomy protocols and the creation of tumor boards involve changes in routines with the implementation of protocols and deviations from ingrained treatment philosophies, although the decrease of complications and length of stay may decrease costs.11 Thus, the implementation of standardized protocols for esophagectomy can be challenging, especially in underdeveloped countries. In fact, Findlay et al.4 reported that less than half of the patients completed the proposed pathway mostly due to the occurrence of complications. The small number of published series also attests the low prevalence of adoption of these protocols.

Our results show that surgeons are the most specialized staff member and still the leader of the multidisciplinary team. Less than 30% had a specialized anesthesiologist, even with a well-established relationship between intraoperative anesthetic care and improved outcomes in patients with cancer. Lancet. 2003 Oct 11;362(9361):1225-30.

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The prevalence of standardized protocols and specialized teams is very low in São Paulo. The presence of specialized surgeons is a reality and standardized protocols related directly to surgeons have higher frequency than those related to other professionals in the multidisciplinary team.