# The Surgical Cases of Esophageal Squamous Cell Carcinoma and Adenocarcinoma in Shanxi, Changzhi Hospital in China: Demographics, Tumor Characteristics, and Surgical Care

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## Background

Esophageal squamous cell carcinoma (ESCC) and Adenocarcinoma (EAC) are the two most common histological types of esophageal cancer (EC) worldwide. Although both belong to EC, risk factors, tumor locations and surgeries vary between EAC and ESCC. Geographically, Shanxi Changzhi in mid-north China has a substantially high EC incidence, yet limited patient data were reported given underdevelopment. This research aims to investigate the patient demographics and surgical care of EAC and ESCC in a regional Shanxi Changzhi hospital.

## Method

Patient charts, surgical notes, and pathology reports were extracted from May to July 2023 for hospitalized EC patients. Patient age, gender, primary and secondary diagnoses, pathology, surgical treatment, and length of stay (LoS) were recorded. A random sample of surgical cases in July was observed to validate the surgical operation notes. Descriptive statistics were summarized to analyze the ESCC and EAC patients by demographics, tumor characteristics, surgical operations and hospitalizations.

## Results

A total of 81 EAC and 32 ESCC patients were admitted to surgical units of the hospital in the 3-month timeframe. All 83 (100%) EAC patients were admitted in Gastrology, 30 (93.8%) ESCC patients in Thoracic and 2 (6.2%) in Gastrology.

EAC has higher occurrences in males than ESCC (75.3% vs. 59.4%). Although median and mean ages were similar (EAC: median age=65 and mean age=65.1; ESCC: median age=68 and mean age=66.7), EAC patients have a higher proportion of young age groups (EAC: 21.0% in age >40 <60; ESCC: 9.4% in age >40 <60).

Tumor locations were at the esophagogastric junction in 81(100%) of the EAC patients, in the esophagus in 30 (93.8%) ESCC patients, and at the esophagogastric junction in 2 (6.2%) of the ESCC patients admitted to Gastrology department. All patients had confirmed TNM pathologic staging; the majority of them were with M0, whereas more EAC patients were in stage III (41.98%) vs. more ESCC patients were in stage II (34.48%). Distributions in other stages were similar between EAC and ESCC patients.

Surgical care and operations for EAC and ESCC patients were different. Comparing to ESCC patients, more EAC patients underwent open surgeries (15.7% vs. 0%), while less EAC patients had chemo- or other therapy infusions (10% vs. 22.2%) and higher proportion of no operation (41.4% vs. 22.2%). Operations among ESCC patients admitted in Thoracic included chemotherapy infusion, thoracoscopic three-incision esophagectomy, or combined thoraco-laparoscopic three-incision radical esophagectomy (with or without closed chest drainage); none of the 33 patients underwent open thoracic surgery. For EAC and ESCC patients admitted to Gastrology, surgical care included chemo- or other therapy infusion, laparoscopic radical proximal or total gastrectomy, or open radical proximal or total gastrectomy.

Hospital LoS was associated with the type of surgical care and type of EC, although overall LoS between EAC and ESCC were similar. Aside from open surgeries, EAC patients consistently had longer LoS than ESCC patients in chemo- or other therapy infusions, minimally invasive surgeries, and no surgical operations.

**Table 1. Demographic Characteristics of EAC and ESCC Patients That Underwent Surgical Care from May to July 2023**

| | EAC | ESCC |
|---|---|---|
| N | 81 | 32 |
| Mean Age, year | 65.12 | 66.72 |
| SD | 8.23 | 6.66 |
| Median Age, year | 65 | 68 |
| 25th, 75th | (60, 74) | (63, 71) |
| Min, Max | (41, 82) | (50, 77) |
| **Age group, %** | | |
| >40 < 60 | **20.99%** | 9.38% |
| >=60 <65 | 24.69% | 25.00% |
| >=65 <75 | 44.44% | 56.25% |
| >=75 | 9.88% | 9.38% |
| **Male** | | |
| n, % | **61 (75.31%)** | 19 (59.38%) |
| Age>40 <60, male | **16.05%** | 6.25% |
| Age>=60 <65, male | **17.28%** | 12.50% |
| Age >=65 <70, male | 34.57% | 34.38% |
| Age >=75, male | 7.41% | 6.25% |
| **Female** | | |
| n, % | 20 (20.69%) | 13 (40.63%) |
| Age>40 <60, female | 4.94% | 3.13% |
| Age>=60 <65, female | 7.41% | **12.50%** |
| Age >=65 <70, female | 9.88% | **21.88%** |
| Age >=75, female | 2.47% | 3.13% |

**Notes:**

EAC= Esophageal Adenocarcinoma; ESCC=Esophageal Squamous Cell Carcinoma

### Ages of ESCC vs. EAC Patients Stratified by Sex

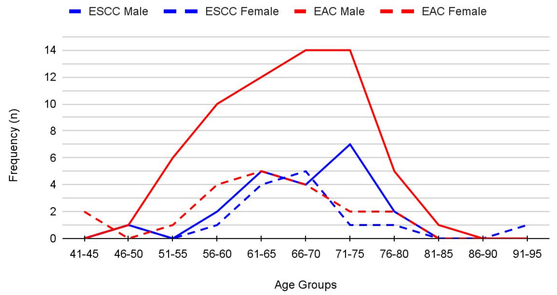



**Table 2. The Tumor Characteristics of EAC and ESCC Patients**

| | EAC | ESCC |
|---|---|---|
| **N** | 81 | 32 |
| **Tumor location, n(%)** | | |
| Esophageal | 0 | 30 (93.75%) |
| Esophagogastric junction | 81(100%) | 2 (6.25%) |
| **Tumor stage[1], n(%)** | | |
| Stage 0 | 15 (18.56%) | 6 (18.75%) |
| Stage I | 19 (23.46%) | 7 (21.88%) |
| Stage II | **9 (11.11%)** | **11 (34.38%)** |
| Stage III | **34 (41.98%)** | **7 (21.88%)** |
| Stage IV | 4 (4.94%) | 1 (3.13%) |
| **Tumor metastasis, n(%)** | | |
| M0 | 77 (95.06%) | 32 (100%) |
| M1 | 4 (4.94%) | 0 (0%) |

**Notes:**

EAC= Esophageal Adenocarcinoma; ESCC=Esophageal Squamous Cell Carcinoma

[1] the tumor stage is the pathological stage based on The American Joint Committee on Cancer (AJCC) version 9 cancer staging system.

**Table 3. The Surgical Care and Operations for EAC and ESCC Patients**

| | EAC[2] (N=70) | ESCC[1] (N=27) |
|---|---|---|
| **Surgical Care & Operations, n(%)** | | |
| Chemo- or other therapy infusion | 7 (10%) | 6 (22.22%) |
| Minimally invasive surgery | **23 (32.86%)** | **15 (55.56%)** |
| Open surgery | 11 (15.71%) | 0 (0%) |
| No operation (n/a) | **29 (41.43%)** | **6 (22.22%)** |
| **Operation in Thoracic Department, n(%)** | | |
| Thoracoscopic three-incision esophagectomy | n/a | 5 (18.52%) |
| Combined thoraco-laparoscopic three-incision radical esophagectomy | n/a | 10 (37.04%) |
| with closed chest drainage | n/a | 4 (14.81%) |
| **Operation in Gastronologic Department, n(%)** | | |
| Laparoscopic radical proximal or total gastrectomy | 23 (32.86%) | n/a |
| Open radical proximal or total gastrectomy | 11 (15.71%) | n/a |

**Table 4. The Hospital Length of Stay for EAC and ESCC Patients, by Type of Surgical Care**

| | EAC[2] (N=70) | ESCC[1] (N=27) |
|---|---|---|
| **Overall** | | |
| n (%) | 70 (100%) | 27 (100%) |
| mean (SD) | 19.41 (13.78) | 17.15 (11.83) |
| median | 18 | 17.5 |
| min, max | 3, 92 | 1, 42 |
| **Chemo- or other therapy infusion, days** | | |
| n (%) | 7 (10%) | 6 (22.22%) |
| mean (SD) | 14.14 (8.01) | 5.33 (0.82) |
| median | **11** | **5.5** |
| min, max | 7, 26 | 4, 6 |
| **Minimally invasive surgery, days** | | |
| n (%) | 23 (32.86%) | 15 (55.56%) |
| mean (SD) | 29.09 (16.18) | 25.53 (8.12) |
| median | **26** | **22** |
| min, max | 12, 92 | 15, 42 |
| **Open surgery, days** | | |
| n (%) | 11 (15.71%) | 0 (0%) |
| mean (SD) | 26.36 (8.42) | n/a |
| median | **27** | n/a |
| min, max | 14, 41 | n/a |
| **No operation, days** | | |
| n (%) | 29 (41.43%) | 6 (22.22%) |
| mean (SD) | 10.04 (5.18) | 6.17 (3.97) |
| median | **8.5** | **6** |
| min, max | 3, 21 | 1, 13 |

**Notes:**

EAC= Esophageal Adenocarcinoma; ESCC=Esophageal Squamous Cell Carcinoma

[1] n=5 ESCC patients didn't have any noted surgery status during the study period

[2] n=10 EAC patients haven't had any noted surgery status during the study period

## Discussion

- EAC was disproportionately higher in younger age groups and in males than ESCC in Shanxi, Changzhi.
- Different tumor locations of EAC and ESCC resulted in different department admissions and different surgical care and operations.
  - Although ESCC patients displayed more advanced tumor stages, they experienced less open surgeries in the thoracic department and a shorter length of stay than EAC patients.

## Conclusion

EAC and ESCC patients had different demographics, tumor characteristics, and varied in surgical care and operations. This research sheds light on separating ESCC and EAC in EC reporting, calling for further patient surveys investigating lifestyle risk factors and coordination of care for EAC and ESCC patients in this high prevalence, underdeveloped region.