

# Effects of Palliative Esophageal EBRT in Patients with Stent for Esophageal Cancer: Retrospective Cohort Study

Emily Adams, BScHa, Héloïse Lavoie-Gagnon, MD, FRCPCb, Farhana Islam, MScc, Michael Humer, MD, FRCSCd, Benjamin

Mou, MD, FRCPCe, Theodora A. Koulis, MD, FRCPCf, David Kim, MD, FRCPCe, Siavash Atrchian, MD, FRCPCe

"Faculty of Medicine, University of Toronto, Canada, "Department of Radicbiologie et Médecine Nucléaire, Université de Sherbrooke/Hospitalier Universitaire de l'Université Sherbrooke (CHUS), Canada, "Department of Pharmacology and Toxicology, University of Toronto, Canada "Division of Thoracic Surgery, Department of Surgery, University of British Columbia, Kelowna, Canada "Department of Radiation Oncology, BC Cancer – Victoria, Canada "Depart



## BACKGROUND/PURPOSE

Self-expandable metallic stents (SEMS) provide immediate but nondurable dysphagia relief in esophageal cancer, while external beam radiotherapy (EBRT) provides slower but more durable dysphagia relief [1]. While the combination of SEMS with EBRT would seem to offer both rapid and durable dysphagia relief in the palliative setting, there remains controversy on its safety and efficacy [2].

We investigated patient outcomes regarding EBRT after SEMS placement in patients with incurable esophageal cancer at a regional Canadian cancer program.

### **METHODS**

- After ethics approval, we reviewed patient records from BC Cancer's Cancer Agency Information System (CAIS) and Kelowna General Hospital (KGH) Thoracic Surgery department's EMR software
- Inclusion Criteria: Patients with unresectable esophageal cancer who never received radical treatment and had an esophageal SEMS placed at KGH Thoracic Surgery from January 1st 2010 to July 24th 2020
- Eligible patients were divided into 2 treatment groups:
  - SEMS Alone: Patients who had a SEMS placed and never received esophageal EBRT
  - SEMS + EBRT: Patients who had a SEMS placed and received esophageal EBRT while the SEMS was in place
- Exclusion Criteria:
  - No esophageal cancer
  - · Radioactive SEMS
  - Esophagectomy
  - EBRT to or near the esophagus before 1st SEMS placement
  - SEMS Alone: Post-SEMS EBRT near but not targeting the esophagus
  - SEMS + EBRT: Radical EBRT dose or SEMS was removed or migrated fully out of radiotherapy field before FBRT
- Patient demographics, treatment and mortality details, and stent-related complications were collected
- Stent-related complications were recorded according to the Clavien-Dindo classification system
  - For most complication types, only grades III and above were recorded

- For complications directly involving the stent (food impaction, migration, tumour ingrowth or overgrowth), all grades were recorded
- Primary endpoint analyses investigated associations between radiation status and a) number of complications, b) complication severity and c) survival
  - Each analysis was adjusted for age at 1st SEMS placement, days from diagnosis to 1st SEMS placement, first SEMS type placed, chemotherapy status, esophageal dilation status, and esophageal tumour location
- Within the SEMS + EBRT group, associations between radiation dose (EQD2) and number and severity of complications were investigated

#### RESULTS

#### Patient Baseline Characteristics and Treatment Details

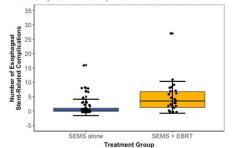
There were no significant differences between treatment groups in terms of age, sex, tumour location, TNM stage, tumour grade, histologic type, chemotherapy or dilation status, age at 1<sup>st</sup> SEMS placement, 1<sup>st</sup> SEMS type placed or days from diagnosis to 1<sup>st</sup> SEMS placement.

#### **Number of Stent-related Complications**

A strong association was observed between radiation status and number of stent-related complications (F(1,83)=14.13, p<0.001).

The SEMS Alone group showed 3.05 (95% CI: [-4.67, -1.44]) lower number of stent-related complications compared to the SEMS + EBRT group.

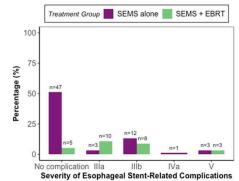
 Patients who did not receive chemotherapy demonstrated 3.92 (95% CI [-5.71, -2.14]) lower number of complications compared to those who did



## Stent-related Complication Severity

The SEMS Alone group had 9.05 (95% CI: [3.11, 26.27]) greater odds of having more severe stent-related complications compared to the SEMS + EBRT group (Wald  $\chi^{\Lambda}(1)=16.39$ , p<0.001).

- Patients who did not receive chemotherapy had more severe complications than those who did by a factor of 9.35 (95% CI: [2.86, 30.61])
- The odds of having more severe complications decreased significantly with age at 1st SEMS placement. Patients aged 50-65 years had 0.47 (95% CI: [0.23, 0.94]) odds of having higher grade complications while those aged 65-95 years had 0.22 (95% CI: [0.05, 0.89]) odds



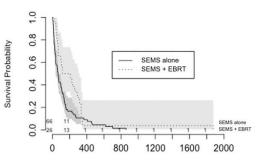
#### Survival

Our analysis showed significantly longer overall survival in the SEMS + EBRT (log rank (Mantel-Haenzsel)  $\chi^2(1)=4.00$ , p = 0.040).

The median overall survival was 163.5 days (95% CI [65, 302]) in the SEMS + EBRT group and 65 days (95% CI [36, 105]) in the SEMS Alone group.

In the CPH analysis, the SEMS Alone group had 1.56 (95% CI:  $[0.93,\ 2.63]$ ) times the hazard of all-cause mortality relative to the SEMS + EBRT group.

 Relative to patients who received chemotherapy, patients without a history of chemotherapy had 5.28 (95% CI [2.78, 10.01]) times higher hazard of all-cause mortality.



Elapsed time: Days from first stent to all-cause mortality

Within the SEMS + EBRT group, EQD2 was not significantly associated with number of stent-related complications (F(1,17)=0.47, **p=0.502**). Similarly, EQD2 was not significantly associated with the severity of stent-related complications within the SEMS + EBRT group (Wald x^2(1,8)=0.99, **p=0.319**).

#### CONCLUSIONS

Addition of EBRT to SEMS was associated with more numerous yet less severe stent-related complications and increased overall survival, suggesting that post-stent EBRT does not increase stent complication severity and may benefit survival, although the overall impact on quality of life is unclear.

Additionally, the lack of significant associations between EQD2 and the number or severity of stent-related complications suggests that these complications are dose-independent for palliative EBRT regimens.

Further research investigating quality of life outcomes in SEMS plus EBRT palliation would help elucidate the utility of this treatment option, particularly as palliation approaches often emphasize quality of life over longevity.

#### **REFERENCES**

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