

**RADIATION-INDUCED ESOPHAGEAL CARCINOMA 11 YEARS AFTER  
MEDIASTINAL IRRADIATION: CASE REPORT AND LITERATURE REVIEW**

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**ABSTRACT**

**Background:** Radiation-induced esophageal cancer is rare occurring several years after mediastinal irradiation. The purpose of this study is to report a case of this pathology and to review the literature, analyzing its diagnostic, therapeutic and prognostic characteristics. **Case Presentation:** A 41-year-old woman, with no evidence for risk factors (abuse of nicotine or alcohol), treated for a left breast cancer in 2005 with surgery, adjuvant chemotherapy and radiation therapy, present after 11 years of local control, carcinoma of the cervical esophagus T4bN0M0 According to the TNM classification of Carcinoma of the Esophagus and Esophagogastric Junction (8<sup>th</sup> edition, 2017) (AJCC American Joint Committee on Cancer). She was treated with radiation therapy (50,4Gy, 1,8Gy per fraction (28 fractions, with Linac RC3D)) and concomitant chemotherapy (Cisplatin 70mg per week). Our patient died 7 months after radiation therapy (local and metastatic progression). **Conclusion:** Radio-Induced esophageal cancer is a rare entity, he should be suspected in a patient with dysphagia and history of mediastinal irradiation. The treatment of this cancer remains difficult with a poor prognosis.

**KEYWORDS:** American Joint Committee, Esophagogastric, mediastinal.

**1. INTRODUCTION**

Esophagus is considered an organ at risk for breast carcinoma irradiation. Patients can rarely develop, several years after irradiation, as a late toxicity an esophageal carcinoma, considering radiation-induced cancer. The purpose of this study is to report a case of this pathology and to review the literature, analyzing its diagnostic, therapeutic and prognostic characteristics.

**2. CASE REPORT**

A 41-year-old woman, with no evidence for risk factors (abuse of nicotine or alcohol), was referred to our department with complaints of dysphagia and dyspnea in January 2016.

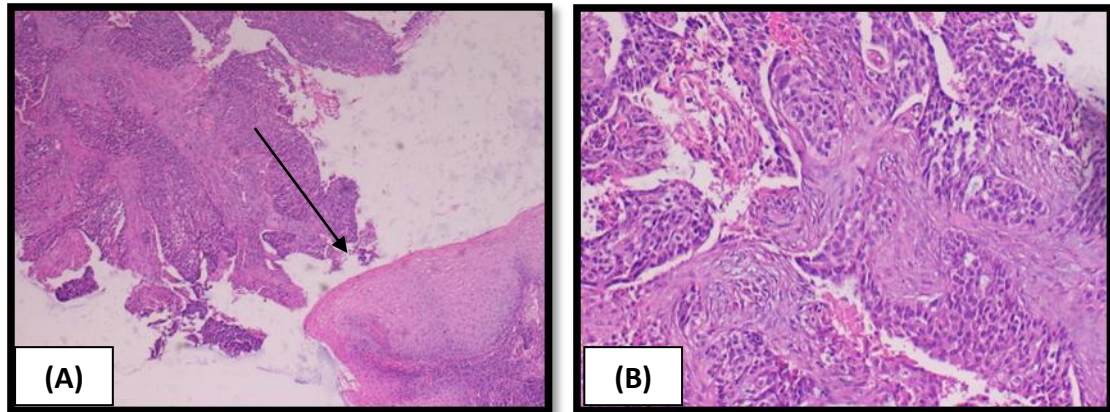
In March 2005 the patient was diagnosed to have an invasive breast adenocarcinoma grade II of Scarff-Bloom-Richardson with positive estrogen and progesterone-receptors (30%), HER2 negative status pT2N1M0 stage IIB. She was treated with surgery (Left mastectomy and ipsilateral axillary dissection), adjuvant chemotherapy (six courses of Doxorubicin 60mg/m<sup>2</sup> and Cyclophosphamide 600mg/m<sup>2</sup>), radiation therapy for the left chest wall, left supraclavicular and internal mammary lymph nodes at a total dose of 50 Gy (5 X 2 / week) using a Cobalt-60 machine, and hormone therapy

(Tamoxifen) for five years stopped in 2010. She had a good loco regional control.

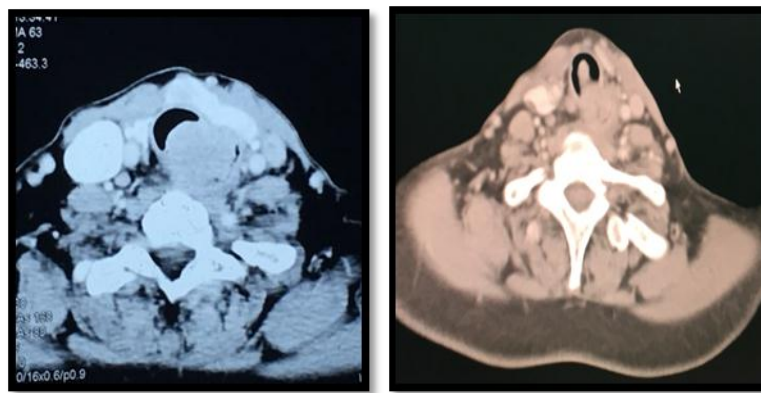
Because of dysphagic complaints, esophagoscopy with biopsy was carried out in March May 2016. A moderately differentiated squamous cell carcinoma of the cervical esophagus was found (Fig.1). A cervical CT-scan was carried out for determination of tumor extent and an infiltration of the trachea was suspected (Fig.2), bronchoscopy showed that the patient has a tracheal compression extended for over 4 cm and estimated at 80%, Resection of the tumor and establishment for an intra luminal stent was performed (Fig.3). Any additionally cervical lymph nodes have been detected. There was no distant metastasis. According to the TNM classification of Carcinoma of the Esophagus and Esophagogastric Junction (8<sup>th</sup> edition, 2017) (AJCC American Joint Committee on Cancer) a clinical stage T4bN0M0 resulted.

Our patient was treated with radiation therapy (50,4Gy, 1,8Gy per fraction (28 fractions, with Linac RC3D)) and concomitant chemotherapy (Cisplatin 70mg per week); she finished her treatment in 22 November 2016.

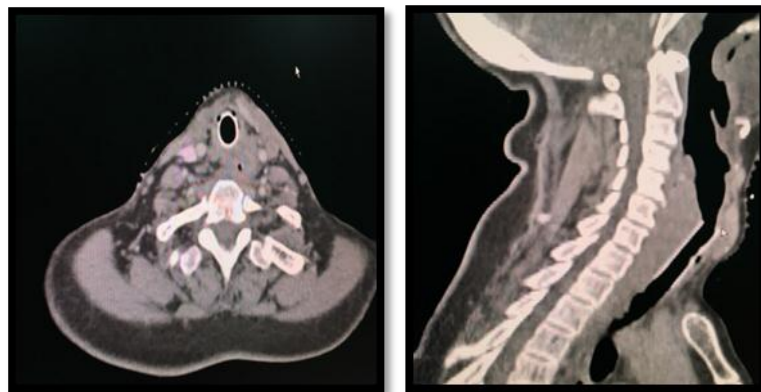
At least of a first clinical benefit, our patient died 7 months after the treatment (metastatic progression).



**Fig.1:** Pathologic examination with H&E staining (A) H&E stain showing tumor and normal surface epithelium (black arrows)( H&Ex40). (B) H&E stain at high magnification moderately-differentiated squamous cell carcinoma with spans and cell clusters (H&Ex100).



**Fig.2:** cervical CT-scan showing an infiltration of the trachea by the tumor.



**Fig.3:** CT-Scan after bronchoscopic resection of the tumor and establishment for an intra luminal stent.

### 3. DISCUSSION

The carcinogenic effect of ionizing radiation is very reported in the literature<sup>[1]</sup>, the result of irradiation of the esophagus when we irradiate the internal mammary and supraclavicular lymph nodes is developing, several years after irradiation, an esophageal radiation-induced carcinoma.

The criteria for establishing a radiation-induced malignancy are<sup>[2]</sup>

- The knowledge of prior irradiation

- The appearance of a malignancy in the irradiated area.
- Radiation damage to the remaining tissues.
- A long, latent interval between the irradiation and the appearance of the malignancy.

Our patient fits some criteria of radiation induced cancers as previously described.

We found some case reports described mainly the squamous cell carcinoma subtype.<sup>[3]</sup>

In two cohorts reporting data from the SEER, there was an increased risk of developing esophageal cancer after breast cancer radiation.<sup>[4,5]</sup> The first cohort report that the risk increased with time (incidence ratio of 5.42 for esophageal squamous cell carcinoma 10 years after radiotherapy).<sup>[6]</sup> In the second cohort, esophageal carcinoma risk increases only for the upper and middle third of the esophagus and the relative risk of 2.17 (95% confidence interval: 1.67, 4.02) for squamous cell esophageal cancer. Similar data were obtained from other cohorts (Dutch and Scandinavian).<sup>[7,8]</sup>

Different treatments have been proposed, surgery is preferred by most authors.<sup>[9]</sup> Radiation therapy is recommended for cervical esophageal carcinoma.<sup>[10]</sup> We followed the standard of treatment for our patient.

Follow-up of patients with mediastinal irradiation is recommended for early staging and better take of care.

#### Competing interests

The authors have declared that no competing interest exists.

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#### Ethical Approval

Ethics Committee of the National institute of Oncology, Mohammed 5 University, Rabat, Morocco

#### Consent

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

#### Author's contributions

MY drafted the manuscript and all authors read and approved the final manuscript.

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