# Incidence and Risk Factors of Newly Diagnosed Atrial Fibrillation in Colorectal Cancer Patients

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## INTRODUCTION

The number of cancer survivors in the United States is projected to increase to approximately 19 million by 2024, primarily due to the emergence of increasingly effective, individualized cancer therapies.

Cancer, and its treatments, can increase the risk of developing cardiac conditions such as Atrial Fibrillation (AF). For elderly Colorectal Cancer (CRC) patients, a comorbid AF diagnosis may affect treatment decisions and clinical outcomes.

Currently, a prospective cohort study in UK based population is also going on to report the incidence of atrial fibrillation after elective colorectal cancer resection in the over 65 age group. In the United States, a risk model for developing newly diagnosed atrial fibrillation is lacking to assess the risk factors among comparable patient populations in real-world settings.

## OBJECTIVES

The objective of the study was to to quantify the incidence of newly diagnosed AF in elderly CRC patients and the risk factors associated with it.

## METHODS

Using the Surveillance, Epidemiology, and End Results (SEER)-Medicare-linked database, We performed a retrospective cohort study to characterize the risk factors associated with the incidence of NOAF in newly diagnosed colorectal cancer patients. CRC patients were identified between January 1, 2016 – December 31, 2018. The patients were followed for 1 year for the incidence of NOAF.

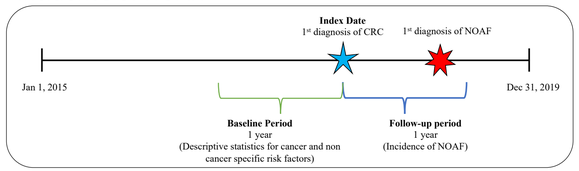


**Figure 1:** Study design - Risk factors. The incident NOAF patients were diagnosed with 1 inpatient claim / 1 provider claim or 2 outpatient claims for AF, or 1 outpatient claim along with a prescription of AF medication within a follow-up period of 1 year. AF - Atrial fibrillation; CRC - Colorectal cancer; NOAF - New-onset atrial fibrillation, also known as newly diagnosed AF.

## METHODS (CONTINUED)

**Inclusion Criteria –**

- 1st Diagnosis of CRC (any stage) between Jan 1, 2016 – Dec. 31, 2018 (Index date)
- Age ≥ 65 years at the index date
- Medicare enrolment 12 months pre- and post index date.
- At least one healthcare claim in 12 months preceding index date.

**Exclusion Criteria –**

- Previous diagnosis of another cancer
- Development of another primary cancer or death within 1 year of follow-up
- Prevalent Atrial Fibrillation
- Patients with missing values

**Study Outcomes -** The study quantified the incidence of NOAF in those with a new diagnosis of colorectal cancer and identified the cancer-specific and non-cancer-specific risk factors associated with the development of NOAF.

## RESULTS

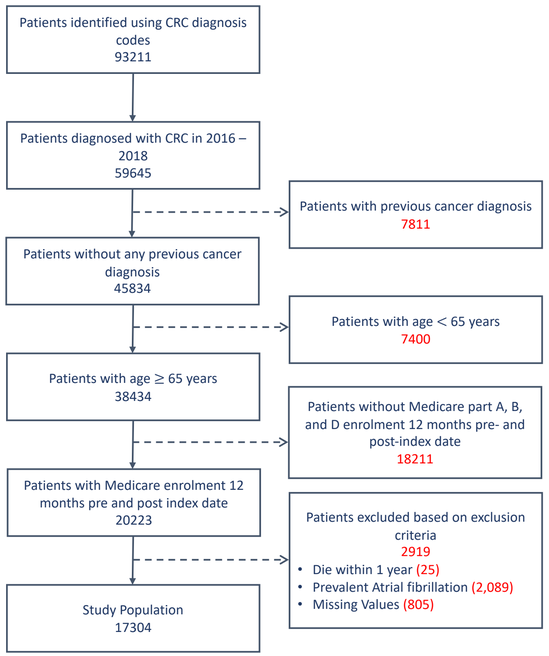


**Figure 2 :** Our study population consisted of 17,304 elderly colorectal cancer patients. Out of these 17,304 patients, 2101 were diagnosed with new-onset atrial fibrillation.

**Table 1:** This table identifies the demographical and clinical characteristics of CRC patients in the baseline period stratified by the incidence of atrial fibrillation.

| Variable | AF | No AF | Total | P-value |
|---|---|---|---|---|
| | 2101 (12.1) | 15203 (87.9) | 17304 | |
| **Age, median (IQR)** | 79 (73, 85) | 74 (70, 81) | 75 (70, 81) | < .0001 |
| **Gender, n (%)** | | | | < .0001 |
| **Female** | 1036 (49.3) | 8400 (55.2) | 9436 (54.5) | |
| **Race, n (%)** | | | | < .0001 |
| **White** | 1830 (87.1) | 12088 (79.5) | 13918 (80.4) | |
| **Black** | 132 (6.3) | 1613 (10.6) | 1745 (10.1) | |
| **Geography, n (%)** | | | | 0.0915 |
| **Midwest** | 161 (7.7) | 1154 (7.6) | 1315 (7.6) | |
| **Northeast** | 816 (33.8) | 5559 (36.6) | 6375 (36.8) | |
| **CRC Type, n (%)** | | | | < .0001 |
| **Colon** | 1650 (78.5) | 11190 (73.6) | 12840 (74.2) | |
| **Rectum** | 295 (14.0) | 2876 (18.9) | 3171 (18.3) | |
| **Cancer Stage, n (%)** | | | | < .0001 |
| **0** | 69 (3.3) | 679 (4.5) | 748 (4.3) | |
| **1** | 802 (38.2) | 5975 (39.3) | 6777 (39.2) | |
| **2** | 397 (18.9) | 2454 (16.1) | 2851 (16.5) | |
| **3** | 577 (27.5) | 3905 (25.7) | 4482 (24.9) | |
| **4** | 256 (12.1) | 2190 (14.4) | 2446 (14.1) | |
| **Cancer Therapy , n(%)*** | | | | |
| **Pharmacotherapy**** | 77(3.7) | 802(5.3) | 879 (5.1) | 0.0016 |
| **Surgical Therapy** | 795(37.8) | 4036(26.6) | 4831 (27.9) | < .0001 |
| **Comorbidities** | | | | |
| **Hypertension, n (%)** | 528 (25.1) | 3597 (23.7) | 4125 (23.8) | 0.138 |
| **Diabetes, n (%)** | 243 (11.6) | 1783 (11.7) | 2026 (11.7) | 0.8286 |
| **$CHA_2DS_2$-VASc Score, median (IQR)** | 3 (2, 3) | 2 (2, 3) | 2 (2, 3) | < .0001 |
| **Charlson Comorbidity Index, mean (SD)** | 1.06 (1.8) | 0.84 (1.5) | 0.87 (1.5) | < .0001 |

* Indicator variable for receiving different cancer therapies during the baseline period.
** Includes biologics and chemotherapy administered to CRC patients

**Incidence Rate -** The study found that elderly colorectal cancer patients have a relatively high incidence rate of atrial fibrillation diagnosis (**121.4 per 1000 person-years**: 95% CI - 116.6, 126.5).

## CONCLUSION

The underlying mechanisms that may contribute to the development of atrial fibrillation in patients with colorectal cancer are not fully understood, but several factors may play a role.

- Cancer-related inflammation and oxidative stress
- Chemotherapy and radiation therapy - may have direct or indirect effects on the heart and the cardiovascular system.
- Comorbidities
- Genetic and environmental factors that contribute to the development of both colorectal cancer and atrial fibrillation.

Overall, the development of atrial fibrillation in patients with colorectal cancer is likely to be multifactorial and may involve interactions between cancer-related factors, treatment-related factors, and pre-existing comorbidities.

## STRENGTHS & LIMITATIONS

**Strengths**

- Use of comprehensive, large dataset like SEER-Medicare
- Longitudinal study design
- Use of statistical methods to strengthen the validity of results

**Limitations**

- Claims data does not include all health-related information
- The results may not be generalizable to younger groups or patients without CRC
- Delay in data availability
- Retrospective nature of study

## REFERENCES

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