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# Potential Mechanisms for New Onset Atrial Fibrillation in COVID-19 Patients

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## Introduction

COVID-19 is associated with many heart complications like hypercoagulability, pulmonary embolism, acute myocardial injury, myocarditis, acute coronary syndrome, and arrhythmias. Particularly alarming are the rates of severe COVID-19 cases in patients with cardiac arrhythmias, predominantly atrial fibrillation (AF). Consequently, significant research efforts have focused on elucidating the mechanisms underlying the development of AF following COVID-19 infection. This review aims to synthesize the findings of such research conducted since the pandemic's inception.

## Methods

| Date of Search | Keyword String | Number of Results |
|---|---|---|
| 9/18/23 | COVID and Cardiovascular | 17,200 |
| 9/18/23 | Covid and Cardiovascular disease | 3,377 |
| 9/19/23 | "atrial fibrillation" COVID-19 | 771 |
| 9/19/23 | "atrial fibrillation" COVID-19 mechanism | 66 |
| 9/19/23 | "atrial fibrillation" long term COVID | 48 |
| 9/19/23 | New Onset atrial fibrillation long term COVID | 7 |

Table 1. Number of search results from PubMed with different keyword strings.

Despite searching for long term COVID, the results gathered focused on hospitalizations instead.

**Inclusion criteria:** Peer-reviewed articles, systematic reviews, primary sources, clinical trials, case reports, cohort studies

**Exclusion criteria:** Articles before 2020, non-English articles, not related to Long-term COVID and Atrial fibrillation

## Results

- The results of the literature search displayed an association between hospitalized COVID patients and AF
- Intensive care unit (ICU) patients were found to have significantly higher prevalence of AF in comparison to non-ICU patients, as shown in Table 2.
- Figure 1 displays a summary of current hypotheses, including dysregulation of ACE2 receptors, T-cell mediated inflammation of the heart, and increased thrombocytes leading to small clots

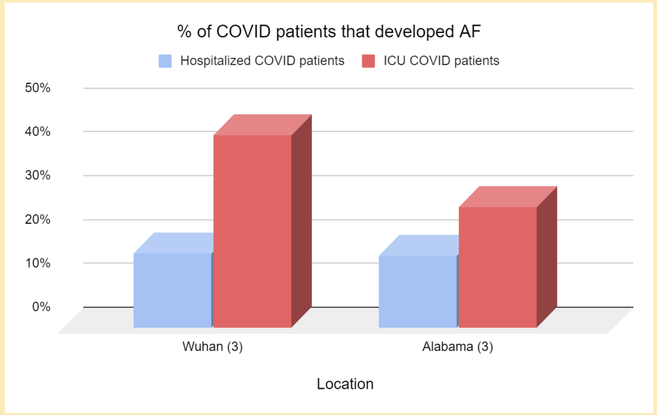


Table 2. Percentages of hospital-admitted COVID-19 patients who presented with atrial fibrillation.
**Another study found 17.7% of mechanically ventilated patients developed AF in a study at a New York hospital.

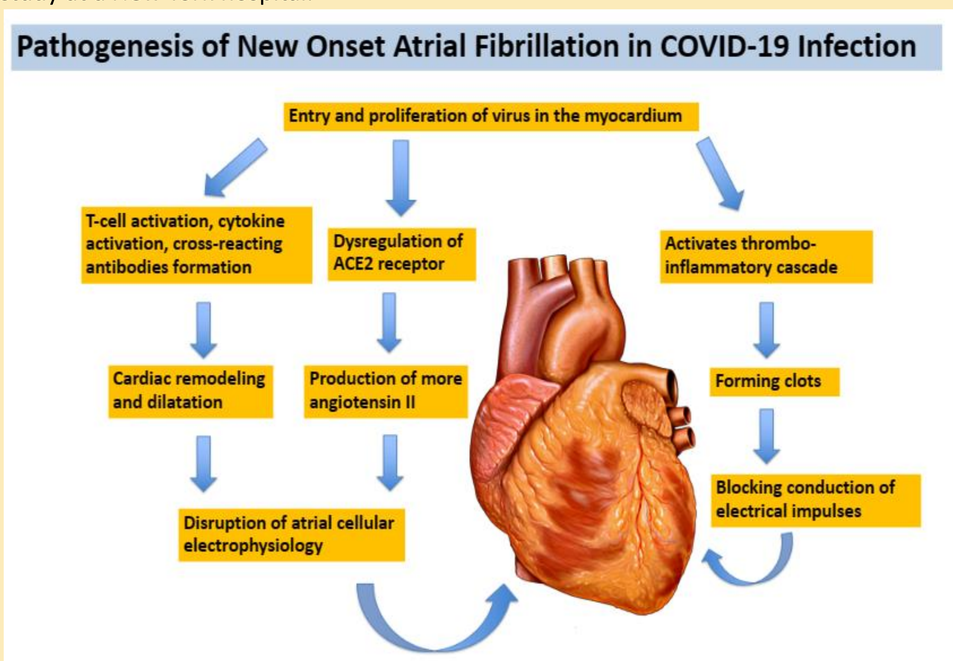


Figure 1. Pathogenesis of New Onset Atrial Fibrillation in COVID-19 patients.

## Limitations

- Limited long-term research studies following patients post-infection
- Sample pool only includes hospitalized patients that were infected with COVID-19
- Future work could include re-infected patients who developed atrial fibrillation

## Discussion

- Review highlights the need for cardiac function monitoring in severe COVID-19 patients as well as viral-induced damage and role of pericytes in heart impact.
- Exploring the potential mechanisms linking SARS-CoV-2 and the development of new-onset atrial fibrillation has important implications for the management of affected patients.
- Would lead to more effective treatment options, monitoring protocols, and rehabilitation measures.
- Along with novel medications and interventions, this would positively impact many patients and improve overall health outcomes.
- Future research could further elucidate mechanisms, in turn, helping develop targeted interventions to mitigate the risk of AF in COVID-19 patients.

## Acknowledgements

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## References: