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Aspirin Use is Associated with Decreased Mechanical Ventilation, ICU Admission, and In-Hospital Mortality in Hospitalized Patients with COVID-19

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Abstract

Background: Coronavirus disease-2019 (COVID-19) is associated with hypercoagulability and increased thrombotic risk in critically ill patients. To our knowledge, no studies have evaluated whether aspirin use is associated with reduced risk of mechanical ventilation, intensive care unit (ICU) admission, and in-hospital mortality.

Methods: A retrospective, observational cohort study of adult patients admitted with COVID-19 to multiple hospitals in the United States between March 2020 and July 2020 was performed. The primary outcome was the need for mechanical ventilation. Secondary outcomes were ICU admission and in-hospital mortality. Adjusted hazard ratios for study outcomes were calculated using Cox proportional hazards models after adjustment for the effects of demographics and comorbid conditions.

Results: Four hundred twelve patients were included in the study. Three hundred fourteen patients (76.3%) did not receive aspirin, while 98 patients (23.7%) received aspirin within 24 hours of admission or 7 days prior to admission. Aspirin use had a crude association with less mechanical ventilation (35.7% aspirin vs. 48.4% non-aspirin, $p=0.03$) and ICU admission (38.8% aspirin vs. 51.0% non-aspirin, $p=0.04$), but no crude association with in-hospital mortality (26.5% aspirin vs. 23.2% non-aspirin, $p=0.51$). After adjusting for 8 confounding variables, aspirin use was independently associated with decreased risk of mechanical ventilation

(adjusted HR 0.56, 95% CI 0.37-0.85, p=0.007), ICU admission (adjusted HR 0.57, 95% CI 0.38-0.85, p=0.005), and in-hospital mortality (adjusted HR 0.53, 95% CI 0.31-0.90, p=0.02). There were no differences in major bleeding (p=0.69) or overt thrombosis (p=0.82) between aspirin users and non-aspirin users.

Conclusions: Aspirin use may be associated with improved outcomes in hospitalized COVID-19 patients. However, a sufficiently powered randomized controlled trial is needed to assess whether a causal relationship exists between aspirin use and reduced lung injury and mortality in COVID-19 patients.

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[trial](#). Busani S, Tosi M, Mighali P, Vandelli P, D'Amico R, Marietta M, Forfori F, Donati A, Cinnella G, De Monte A, Pasero D, Bellani G, Tascini C, Foti G, Ranieri M, Girardis M. *Trials*. 2020 Aug 17;21(1):724. doi: 10.1186/s13063-020-04645-z. PMID: 32807241 Free PMC article.

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- [Risk factors for adverse clinical outcomes with COVID-19 in China: a multicenter, retrospective, observational study](#). Xu PP, Tian RH, Luo S, Zu ZY, Fan B, Wang XM, Xu K, Wang JT, Zhu J, Shi JC, Chen F, Wan B, Yan ZH, Wang RP, Chen W, Fan WH, Zhang C, Lu MJ, Sun ZY, Zhou CS, Zhang LN, Xia F, Qi L, Zhang W, Zhong J, Liu XX, Zhang QR, Lu GM, Zhang LJ. *Theranostics*. 2020 May 15;10(14):6372-6383. doi: 10.7150/thno.46833. eCollection 2020. PMID: 32483458 Free PMC article.
- ["Effect of calcifediol treatment and best available therapy versus best available therapy on intensive care unit admission and mortality among patients hospitalized for COVID-19: A pilot randomized clinical study"](#). Entrenas Castillo M, Entrenas Costa LM, Vaquero Barrios JM, Alcalá Díaz JF, López Miranda J, Bouillon R, Quesada Gomez JM. *J Steroid Biochem Mol Biol*. 2020 Oct;203:105751. doi: 10.1016/j.jsbmb.2020.105751. Epub 2020 Aug 29. PMID: 32871238 Free PMC article. Clinical Trial.
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- [Epidemiology, clinical course, and outcomes of critically ill adults with COVID-19 in New York City: a prospective cohort study](#). Cummings MJ, Baldwin MR, Abrams D, Jacobson SD, Meyer BJ, Balough EM, Aaron JG, Claassen J, Rabbani LE, Hastie J, Hochman BR, Salazar-Schicchi J, Yip NH, Brodie D, O'Donnell MR. *medRxiv*. 2020 Apr 20:2020.04.15.20067157. doi: 10.1101/2020.04.15.20067157. Preprint. PMID: 32511638 Free PMC article. Updated.
- [Association between aspirin therapy and the outcome in critically ill patients: a nested cohort study](#). Al Harbi SA, Tamim HM, Al-Dorzi HM, Sadat M, Arabi YM. *BMC Pharmacol Toxicol*. 2016 Feb 5;17:5. doi: 10.1186/s40360-016-0047-z. PMID: 26850706 Free PMC article. Clinical Trial.

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- [Sex-and age-based differences in the delivery and outcomes of critical care.](#) Fowler RA, Sabur N, Li P, Juurlink DN, Pinto R, Hladunewich MA, Adhikari NK, Sibbald WJ, Martin CM. *CMAJ*. 2007 Dec 4;177(12):1513-9. doi: 10.1503/cmaj.071112. Epub 2007 Nov 14. PMID: 18003954 Free PMC article.

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