

Association of Clostridium difficile Infection and Bone Cancer

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Abstract : Background: Clostridium difficile (C. diff) is a gram-positive bacterium that is known to cause life-threatening diarrhea and severe inflammation of the colon. It originates as an alteration of the gut microbiome and can be transmitted through spores. Recent studies have shown a high association between the development of C. diff in cancer patients due to extensive hospitalization. However, research is lacking regarding C. diff's association in the causation or prevention of cancer. The objective of this study was to therefore assess the correlation between Clostridium difficile infection (CDI) and the incidence of bone cancer. Methods: This retrospective analysis used data provided by a Health Insurance Portability and Accountability Act (HIPAA) compliant national database to evaluate the patients infected versus patients not infected with C. diff using ICD-10 and ICD-9 codes. Access to the database was granted by the Holy Cross Health, Fort Lauderdale, for the purpose of academic research. Standard statistical methods were used. Results: Between January 2010 and December 2019, the query was analyzed and resulted in 78863 patients in both the infected and control group, respectively. The two groups were matched by age range and CCI score. The incidence of bone cancer was 659 patients (0.835%) in the C. diff group compared to 1941 patients (2.461%) in the control group. The difference was statistically significant by a P-value $< 2.2 \times 10^{-16}$ with an odds ratio (OR)= 0.33 (0.31-0.37) with a 95% confidence interval (CI). Treatment for CDI was analyzed for both C. diff infected and noninfected populations. 91 out of 16,676 (0.55%) patients with a prior C. diff infection and treated with antibiotics were compared to the control group were 275 out of 16,676 (1.65%) patients with no history of CDI and received antibiotic treatment. Results remained statistically significant by P-value $< 2.2 \times 10^{-16}$ with an OR= 0.42 (0.37, 0.48). and a 95% CI. Conclusion: The study shows a statistically significant correlation between C. diff and a reduced incidence of bone cancer. Further evaluation is recommended to assess the potential of C. difficile in reducing bone cancer incidence.

Keywords : bone cancer, colitis, clostridium difficile, microbiome

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