Analysis of Symptom Clusters for Adult Patients with Hematologic Malignancies Suffering from Intracranial Hemorrhage

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Significance and Background

In adult hematologic malignancy patients, intracranial hemorrhage (ICH) is the "second leading cause of mortality in patients with acute myeloid leukemia (AML)"[1]. The presence of concomitant thrombocytopenia makes it crucial to rapidly communicate and evaluate signs and symptoms of ICH. The initial signs and symptoms of acute and subacute ICH are often subtle and frequently missed by clinicians. A clinical case of delayed head computed tomography (CT) scan evaluation served as the impetus to form an interprofessional team to review patients diagnosed with ICH in this National Cancer Institute designated Cancer Center. The purpose of this study was to identify early signs and symptom clusters occurring in the adult hematologic malignancy inpatients with ICH.

Literature Review

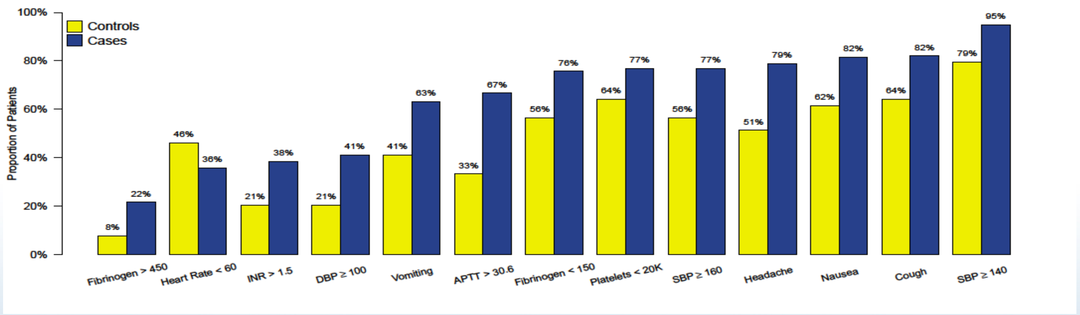
A comprehensive literature review of ICH in adult hematologic malignancy patients was completed using MeSH terms: intracranial hemorrhage, adult hematologic malignancy, acute leukemia, tyrosine kinase inhibitors, bleed. Thirty-five articles were reviewed. One article was excluded, and fourteen were Level V case reports with varying quality. One was level IV, nine were Level III non-experimental studies, four were quasi-experimental studies, and there was one randomized controlled trial. The literature identified risk factors for ICH in cancer patients; however, limited research exists on the signs and symptoms of ICH in patients suffering from hematologic malignancies[2].

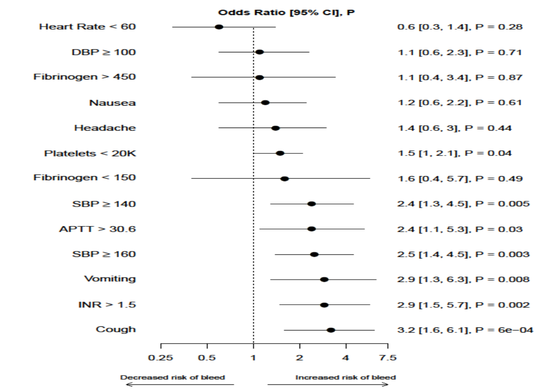
Methods

After IRB approval for an expedited retrospective matched case-control study, medical records of 62 hematologic malignancy inpatients with ICH identified by ICD9 codes were reviewed and confirmed using CT/MRI scans. From 1/1/2011-12/31/2014 the incident rate of ICH in our patient population was 2.8%. 23 patients had an ICH found prior to admission without sufficient lab work or symptoms documented and were excluded. For the 39 included cases of ICH, chart reviews began on day one of admission until day of ICH for lab results. Assessment and vital signs were extracted up until 24 hours after ICH. Charts of 39 matched controls were reviewed from day one of admission through their discharge date. Controls were matched based on diagnosis, treatment, age, sex, and race. Signs, symptoms, and lab work were analyzed by statistician using t-tests, Fisher's exact tests, and conditional logistic regression. An interprofessional team, consisting of nurses, physicians and a statistician was convened and findings reviewed.

Findings

Our ICH case and controls were closely matched with mean ages of 53, 71% white, 60% AML diagnosis, 53% female, and 75% getting induction chemotherapy. When comparing cases of ICH to their matched controls the differences in medians for average number of platelet transfusions and average platelet count were statistically significant. When looking at median and mean percentages of labs, vital signs, and assessments, calculated odds ratio showed that having prolonged prothrombin time (INR>1.5), activated partial thromboplastin time (APTT) greater than 30.6, a cough, vomiting, systolic blood pressure (SBP) greater than or equal to 140, and SBP greater than or equal to 160 were more likely to have an ICH and were statistically significant. Neuro changes were more frequent in cases than controls and also statistically significant. Average time to head CT/MRI from onset of first neurologic symptom was 53 hours with range of 36 minutes to 207 hours (excluded incidental findings).





Limitations

Limitations of this study included: retrospective review, small study population, potential list of symptoms incomplete or incomplete assessment by caregivers with possible inadequate documentation.

Discussion

The identified signs and symptom clusters will be used to develop a protocol for identifying, communicating and acting upon patients suspected of ICH. We anticipate that using a protocol will reduce time from the onset of symptoms/signs of ICH to institution of appropriate evaluation and management.

References
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2. Chen, C. Y., Tai, C. H., Cheng, A., Wu, H. C., Tsay, W., Liu, J. H., Chen, P. Y., & Huang, S. Y. (2012). Intrcranial hemorrhage in adult patients with hematologic malignancies. BMC Medicine, 10(97).

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