DO CANCER DIAGNOSIS AND SURVIVAL RATE AFFECT ALBUMIN LEVEL AND BMI

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# I Introduction:

Malnutrition is a serious condition that can develop when the body is deprived of adequate nutrients such as calorie, protein, vitamins, and minerals to maintain healthy body function (Hopkinsmedicine, 2021). Malnutrition is a common problem among cancer patients, affecting up to 80% of the cancer population. Malnutrition per se is associated with a higher mortality rate and prolonged hospital stay (Bally et al, 2016). Malnutrition can progress into cancer cachexia, which describes a loss of lean muscle and impaired body and mental function. Cancer patients that are suffering from malnutrition have poorer response to cancer treatment and poorer prognosis (Argiles,2005). Nutrition support is often used as an intervention to prevent or reverse malnutrition in a medical inpatient setting. There are two nutrition support methods that have been used in hospitals to provide nutrients to patients when oral intake is not possible or inadequate. Nutrition supports included both enteral nutrition support and parenteral nutrition. In this study, parenteral nutrition support will be the focus of this study. Parenteral nutrition (TPN) describes the infusion of food components directly into a vein. TPN provides carbohydrates, amino acids, lipids, vitamins, and minerals to meet a patient’s need when a patient is unable to eat adequately or unable to use his digestive systems (Longo et al, 2016). There are also several parameters that are used to monitor patients’ nutrition status in a clinical setting. In this study, we will monitor a patient’s BMI and average albumin level compared with his/her clinical outcome (discharged or decreased) and cancer diagnosis. The data is collected in a period of 9 months, 37 patients that were on nutrition support had their average albumin levels, BMI at the beginning of the hospitalization period, their diagnosis as well as clinical outcome recorded.

# II The goal of the study:

In this study, we separate patients into 2 groups: patients with oncologic diagnosis and patients with hematological diagnosis. We will compare their albumin, BMI, death rate as well as diagnosis to see if there is any association using ANOVA analysis.

# III Study design:

This is an observational study. A total of 27 patients at a Cancer Hospital who have received total parenteral nutrition support during the 9 months periods (From 01/2020 to 09/2020) were recorded. Data were retrieved retrospectively from electronic medical records. Average albumin level during the hospital study, BMI at the start of the hospital stay, and the clinical outcome were recorded. Albumin level and the BMI will be dependent variables and we will be using R studio: 2 factors ANOVA to analyze if there is a difference between mean albumin and the BMI for the TPN patients that have either oncology diagnosis or hematology diagnosis and the survival status at the end of the hospital stay.

# IV Result:

Table

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Table IV. 1 Raw data collected from Cancer Hospital from 1/2020 to 9/2020 for all cancer patients on TPN.

Chart, box and whisker chart

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Plot IV. 2 Boxplot of average albumin level for deceased or not deceased patients

Chart

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Plot IV. 3 Boxplot for BMI of patients that are deceased or not deceased.

Chart, box and whisker chart

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Plot IV. 4 Boxplot of average albumin level of oncology patients vs hematology patients.

Average albumin levels are higher for hematology patients compared to oncology patients.

Chart, box and whisker chart

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Plot IV. 5 Boxplot of average albumin level of oncology patients vs hematology patients.

Average BMI for hematology patients is higher than oncology patients.

Text

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Table IV.5 2 factors ANOVA analysis result.

2 factors ANOVA analysis. P-value for death status is larger than α=0.05, we failed to find a significant difference between the mean albumins for patients that have died and the surviving TPN patients. However, P-values for cancer type is 0.0211 which is smaller than α=0.05. We have enough evidence to reject the null hypothesis, there is a significant difference between the albumin levels of oncology patients and hematology patients.

Text

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Table IV.6 TukeyHSD result using R studio.

The mean albumin levels are significantly different between the two different diagnosis groups.



Table IV. 7 There is a negative association between the albumin level and the BMI. The lower that BMI, the lower the albumin level appeared to be.

Chart, scatter chart

Description automatically generated

Plot IV.8 The QQ plot shows that the data appears to satisfy the normality assumption.

A screenshot of a computer

Description automatically generated with medium confidence

Table IV 9 Linear regression for albumin vs cancer+death status. The adjusted R-squared is only 0.1578 which means that only 15% of the variation of the independent variable(albumin level) can be explained by the dependent variable (cancer+death).

# V. Conclusion:

We found that the only significant association is between albumin level and the cancer diagnosis (hematology vs oncology diagnosis). Hematology patients appeared to have lower albumin level as compared to oncology patients. It is likely that since hematology patients have higher incidence of inadequate oral intake due to oncologic diagnosis (such as head and neck cancer or pancreatic cancer) affecting the GI tract more often as compared to hematological conditions. However, it is also likely due to the small data set (only 27 patients) and uneven number of patients in these two groups have affected the reliability of the data. In the future study, data should be collected for a longer period to have a larger data set for more complete analysis of the data.

# Reference:

<https://www.hopkinsmedicine.org/health/conditions-and-diseases/malnutrition>

J.M. Argilés(2005) Cancer-associated malnutrition, European Journal of Oncology Nursing,Volume 9, Supplement 2,Pages S39-S50,ISSN 1462-889,https://doi.org/10.1016/j.ejon.2005.09.006.

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