Original research article

Levels of serum albumin, albumin/globulin ratio in oral cancer patients undergoing elective surgeries.

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Abstract:

The serum protein levels play a major role in the patient outcome especially one who are suffering with oral cancers. Most of the surgeries are major and the patients are nutritionally malnourished due to poor oral intake. The aim of this study is to see the trend of the serum proteins among patients who are posted for the surgeries. **Materials and methods:** This is a retrospective study, the data related to serum albumin, albumin to globulin ration were collected for a period of 1 year from 1st April 2023 till 31st March 2024. The patients who underwent in this study period were considered for this study. Both male and females aged morethan 18 year were part of the study. Any patient who was operated from outside hospital and were refered to our tertiary care hospital for further management were excluded. **Results:** A total of 45 patients underwent surgical ode of treatment. The age group ranged between 20 years till 86 years. Males were comparatively more in number than females, however it is statistically insignificant. The lowest total protein content noted was 4.2g/dl and highest was 8.4. The Lowest albumen noted was 2.5g/dl and highest was 4.4g/dl. The lowest A/G ratio noted was 0.69 and highest was 1.63 **Conclusion:** The serum protein especially the albumen has various role in perioperative period. Screening and optimization should be done for the patient who are undergoing onco-surgeries.

Key words: Albumen, A/G ratio, serum protein, cancer, surgery

Introduction:

Oral cancer, encompassing malignancies affecting the lips, oral cavity, tongue, and pharynx, represents a complex and challenging healthcare issue with substantial implications for patients' overall well-being and quality of life.[1,2] Surgical management, often a cornerstone of treatment for localized oral cancers, demands a comprehensive approach that includes not only tumor resection but also attention to the patient's nutritional status, immune competence, and physiological resilience.[3] This broader perspective is particularly crucial in elective surgeries for oral cancer, where preoperative optimization plays a pivotal role in mitigating perioperative risks and improving long-term outcomes. Serum albumin levels and the albumin/globulin ratio are crucial indicators of nutritional status and immune function in patients undergoing surgical procedures, particularly in the context of oral cancer.[4,5] Oral cancer, a significant health

concern globally, presents unique challenges due to its impact on swallowing, nutrition, and overall systemic health. Surgical interventions, such as elective surgeries for oral cancer, require meticulous preoperative assessment and optimization of nutritional status to ensure optimal outcomes and reduce postoperative complications.

One of the key parameters assessed during preoperative evaluation is the patient's serum albumin levels and the albumin/globulin ratio. Serum albumin, a globular protein synthesized by the liver, serves as a reservoir for essential nutrients, hormones, and enzymes.[6] Its concentration in the bloodstream reflects the body's nutritional status, with lower levels often indicating malnutrition, chronic inflammation, or hepatic dysfunction. In the context of oral cancer, where the disease itself and potential treatment-related challenges can lead to nutritional deficiencies, monitoring serum albumin becomes critical for identifying patients at increased risk of perioperative complications.[7]

The significance of these biomarkers extends beyond mere prognostication; they serve as actionable targets for preoperative optimization strategies. Nutritional interventions, such as oral or enteral supplementation, can be tailored based on individualized assessments of serum albumin levels and nutritional needs. Moreover, addressing underlying inflammation or liver dysfunction can help restore the balance of protein fractions, enhancing the patient's physiological resilience and perioperative tolerance.[8]

Monitoring serum albumin levels and the albumin/globulin ratio becomes paramount. Serum albumin, a major protein synthesized by the liver, reflects the body's protein reserves and nutritional status. [9,10] A decrease in serum albumin levels can indicate malnutrition, inflammation, or liver dysfunction, all of which can adversely affect surgical outcomes. Similarly, the albumin/globulin ratio provides insights into the balance between albumin and other globulin proteins, further refining the assessment of nutritional and immune status. Understanding the significance of serum albumin levels and the albumin/globulin ratio in oral cancer patients undergoing elective surgeries is vital for optimizing perioperative care, enhancing recovery, and reducing the risk of complications.[11]

Materials and methodology:
This is a retrospective study, the data related to serum albumin, albumin to globulin ration were collected for a period of 1 year from 1st April 2023 till 31st March 2024. All data are collected from the records and compiled. The inclusion criteria were, any patient with the age above18 years, either gender who has undergone oral facial surgery due to malignancy during study period were included. The patient who has undergone redo surgery or patient postoperatively referred from other hospital are excluded.
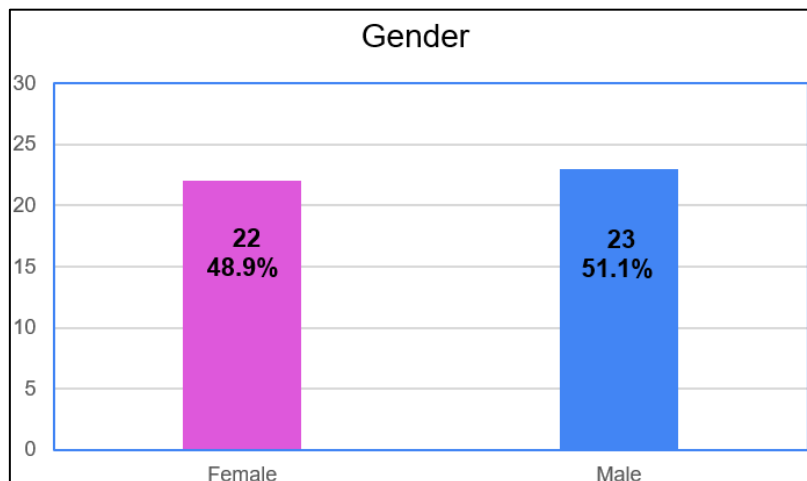
Results:

A total of 45 patients underwent surgical mode of treatment. The age group ranged between 20 years till 86 years Graph 1.
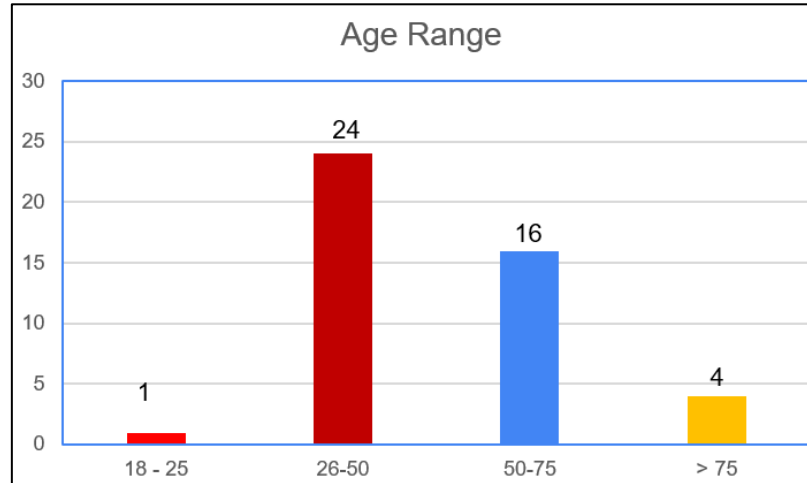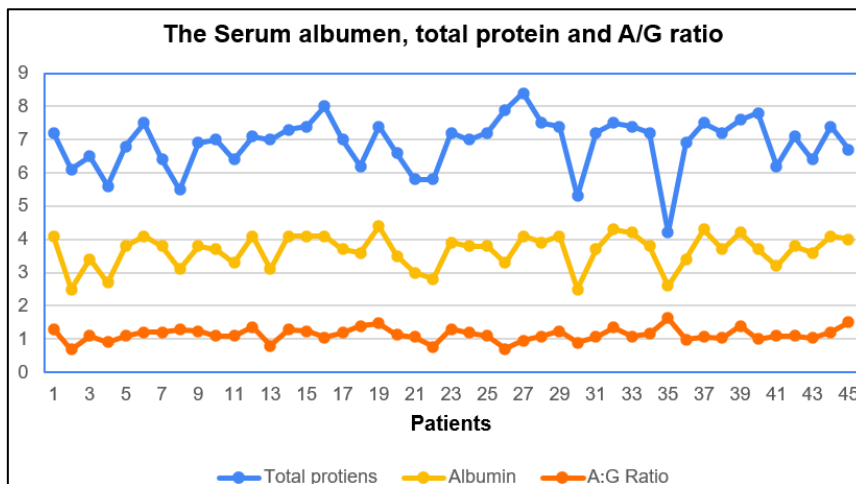

Graph 1: Age wise distribution

Males were comparatively more in number than females (Graph 2), however it is statistically insignificant.

Graph 2: Gender wise distribution.

The lowest total protein content noted was 4.2 and highest was 8.4. The Lowest albumen noted was 2.5 and highest was 4.4. The lowest A/G ratio noted was 0.69 and highest was 1.63 as shown in graph 3.

Graph 3: Shows the serum albumen, total protein and A/G ratio

Discussion:

The assessment of serum albumin levels and the albumin/globulin (A/G) ratio in oral cancer patients undergoing elective surgeries offers valuable insights into their nutritional status and immune competence, which are integral aspects of perioperative care. In this study, a cohort of 45 patients across a wide age range, with a predominance of males, underwent surgical intervention for oral cancer. The results revealed significant variations in total protein content, serum albumin levels, and the A/G ratio, reflecting the diverse nutritional and immunological profiles within this patient population.

The observed range of total protein content, from 4.2 to 8.4 g/dL, underscores the heterogeneity of nutritional status among oral cancer patients undergoing surgery. Malnutrition, a common concern in cancer patients, can impact surgical outcomes by predisposing individuals to postoperative complications, delayed wound healing, and compromised immune function. The lowest albumin level recorded at 2.5 g/dL highlights the presence of hypoalbuminemia in some patients, a condition associated with increased perioperative risks and poorer prognoses in various surgical settings.

The A/G ratio, ranging from 0.69 to 1.63 in this study, reflects the balance between albumin and globulin proteins, with lower ratios indicating potential immune dysregulation or systemic inflammation. While the A/G ratio is not solely indicative of nutritional status, its derangement can signal underlying physiological imbalances that may impact surgical outcomes. The observed variability in the A/G ratio underscores the complexity of immune-nutritional interactions in oral cancer patients, necessitating tailored preoperative assessments and interventions.

The age distribution in the study cohort, spanning from 20 to 86 years, reflects the diverse demographic characteristics of oral cancer patients. Advanced age is often associated with increased comorbidities, nutritional vulnerabilities, and immune senescence, all of which can

influence surgical risks and recovery trajectories. Although the study did not find a statistically significant difference in total protein content or A/G ratio between genders, the larger representation of males aligns with existing epidemiological trends in oral cancer incidence.

These findings emphasize the importance of comprehensive preoperative evaluations, including biochemical assessments of serum albumin levels and the A/G ratio, in guiding perioperative management strategies. Nutritional optimization, through dietary interventions, oral supplements, or parenteral nutrition when indicated, can help address preexisting deficiencies and enhance patients' physiological resilience before surgery. Similarly, interventions targeting inflammation modulation and immune support may contribute to improved postoperative outcomes and long-term recovery.

Limitation of the study:

The study is a retrospective study and the data collected was only for one year. We have not recorded the outcome of the patient who underwent surgery. We have also not documented whether the patient received any perioperative blood or blood products like fresh frozen plasma or parenteral albumen. The study did not record whether the patient is vegetarian or nonvegetarian or mixed by diet which may be a confounding factor. A multicentric study may be beneficial to understand the pattern of protein levels. In this study we have not taken into consideration that whether the patient has undergone any radiation therapy or any medications which causes decrease in the appetite.

Conclusion:

Based on the study results we can say almost all patients had a near normal range of protein levels. Since it is a retrospective study with minimal basic samples the results cannot be extrapolated. There is a need of multicentric study on the pattern of serum protein level who are having oral cancers and undergoing surgery.

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