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COMMENTARY

Serum Albumin in Patients Affected by Gynecological Cancers: Can It Have a Future Role in Prognostic Index or Nomogram?

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An interesting original research entitled "Serum albumin as a predictor of survival after interval debulking surgery for advanced ovarian cancer: a retrospective study" has been recently published in *Journal of Investigate Surgery*. Dai et al. aimed to estimate the value of serum albumin (evaluated at diagnosis and pre-operatively) on predicting survival of 441 women undergoing cytoreductive surgery for treating advanced ovarian cancer. This single-center retrospective analysis reported that albumin at diagnosis was a significant prognostic marker for survival in patients affected: specifically, in case of albumin at diagnosis less than 35 g/L and more than 36 g/L, median overall survival (OS) was 31.5 and 50.4 months, respectively; these values were statistically different ($p = 0.003$). Notably, also after adjusting for cytoreductive outcome, ovarian cancer grade and stage, albumin at diagnosis was a significant prognostic marker. Furthermore, the authors suggested that the role of neoadjuvant chemotherapy (NACT) in improving serum albumin and overall nutritional status is likely to be associated with a survival advantage if no macroscopic residual disease can be achieved at the time of cytoreductive surgical approach [1].

These authors should be congratulated for their interesting results. From the current oncological literature, it is known that a low serum albumin level is correlated with malnutrition and weight loss. Cancer tends to be associated with low albumin levels due to inhibitory effects on its synthesis by the liver and sequestration in ascites or pleural effusion. The rate of albumin synthesis is associated with nutritional and disease states; this has been described as a crucial parameter of long-standing malnutrition [2]. In many studies, the concentration of albumin has been evaluated concomitantly to that of acute-phase proteins (such as serum globulins), which are a marker of systemic inflammatory status [3].

A meta-analysis investigated the prognostic role of pretreatment albumin to globulin ratio in human cancers, evaluating 28 studies with 15,356 patients affected by cancer. Low pretreatment albumin to globulin ratio was associated with reduced OS (HR = 2.08, univariate results; HR = 1.75, multivariate results) and disease-free survival (HR = 1.96, univariate results; HR = 1.64, multivariate results). Moreover, this significant correlation was not altered by stratified analysis according to sample sizes, albumin to globulin ratio cutoff values, and treatment approach [3].

In other gynecological tumors, concentration of serum albumin has been evaluated as a prognostic marker. A Japanese retrospective analysis on 128 women with cervical cancer treated with radiation-based therapy showed that a low albumin to globulin ratio (<1.53) before treatment can be used to predict poor prognosis in patients with cervical cancer (HR= 3.07, $p = 0.044$); however, these results might have been attributable to a high serum globulin level [4]. In another Chinese retrospective analysis on 229 women with cervical cancer multivariate analyses showed that C-reactive protein to albumin ratio was an independent predictor of OS (HR = 2.55, $p = 0.045$). Moreover, a high C-reactive protein to albumin ratio was also associated with a more advanced International Federation of Gynecology and Obstetrics (FIGO) stages ($p < 0.001$) and SCC concentration at diagnosis [5].

An Austrian prospective study evaluated serum albumin levels in 337 women with endometrial cancer. Pretreatment serum albumin levels were inversely proportionally associated with FIGO tumor stage, histological grade, and patients' age. In a multivariable analysis pretreatment serum albumin levels ($p = 0.02$ and $p = 0.001$), FIGO cancer stage ($p < 0.001$ and $p < 0.001$), and histological grade ($p = 0.002$ and $p < 0.001$) were independently associated with progression-free and disease-free survival, respectively [6].

Overall, the identification of factors that could help to predict the prognosis and individualize the therapy in accord to the stratification of risks may improve the survival of patients affected by gynecological cancers. Hypoalbuminemia may have a predictive value of progressive nutritional decline and survival in women with advanced cancer [2]. In the near future, it would be also of interest to evaluate the inclusion of albumin (alone or as in ratio to other blood biomarkers) into an innovative index or nomogram with prognostic oncological predictive value. However, future research is needed to identify an appropriate cutoff value for serum albumin in

order to eventually categorize patients in the different risk classes. At the moment, large prospective multicenter studies are requested to draw a conclusion on the role of albumin as an independent prognostic marker in gynecological tumors.

Disclosure statement

No potential conflict of interests was reported by the author(s).

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