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ALDH1A1 as a Cancer Stem Cell Marker: Value of Immunohistochemical Expression in Benign Prostatic Hyperplasia, Prostatic Intraepithelial Neoplasia, and Prostatic Adenocarcinoma

Authors : H. M. Abdelmoneim, N. A. Babtain, A. S. Barhamain, A. Z. Kufiah, A. S. Malibari, S. F. Munassar, R. S. Rawa

Abstract : Introduction: Prostate cancer is one of the most common causes of morbidity and mortality in men in developed countries. Cancer Stem Cells (CSCs) could be responsible for the progression and relapse of cancer. Therefore, CSCs markers could provide a prognostic strategy for human malignancies. Aldehyde dehydrogenase 1A1 (ALDH1A1) activity has been shown to be associated with tumorigenesis and proposed to represent a functional marker for tumor initiating cells in various tumor types including prostate cancer. Material & Methods: We analyzed the immunohistochemical expression of ALDH1A1 in benign prostatic hyperplasia (BPH), prostatic intraepithelial neoplasia (PIN) and prostatic adenocarcinoma and assessed their significant correlations in 50 TURP sections. They were microscopically interpreted and the results were correlated with histopathological types and tumor grade. Results: In different prostatic histopathological lesions we found that ALDH1A1 expression was low in BPH (13.3%) and PIN (6.7%) and then its expression increased with prostatic adenocarcinoma (40%), and this was statistically highly significant (P value = 0.02). However, in different grades of prostatic adenocarcinoma we found that the higher the Gleason grade the higher the expression for ALDH1A1 and this was statistically significant (P value = 0.02). We compared the expression of ALDH1A1 in PIN and prostatic adenocarcinoma. ALDH1A1 expression was decreased in PIN and highly expressed in prostatic adenocarcinoma and this was statistically significant (P value = 0.04). Conclusion: Increasing ALDH1A1 expression is correlated with aggressive behavior of the tumor. Immunohistochemical expression of ALDH1A1 might provide a potential approach to study tumorigenesis and progression of primary prostate carcinoma.

Keywords : ALDH1A1, BPH, PIN, prostatic adenocarcinoma
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