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Evaluation of prostate-specific antigen (PSA) as prognostic factor related to therapy for prostate cancer patients

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The aim of this study is to assess the dynamic changes of prostate-specific antigen (PSA) according to different therapy methods for prostate cancer (PCa) patients and the relation with severity of disease. This was a prospective observational analysis of diagnostic data from 54 men, between the ages of 53 and 80 years, during January 2023 to December 2024, at a tertiary care oncology hospital. Patients were treated with radical prostatectomy (PR), androgen deprivation therapy (ADT), and radiotherapy-volumetric modulated arc therapy (VMAT). The following data were recorded: age, PSA levels in ng/mL (initial diagnosis, before and 2-4 months after radiotherapy), Gleason Score (GS). Study participants had a mean age 70.4 ± 5.8 years with an initial median interquartile range (IQR) of PSA levels 19 (11.3-45.2). Median interquartile range (IQR) for GS was 2(1-3). Bone metastases were found in 14.8% patients. All patients were treated by VMAT with a mean dose of 6700 ± 814 cGY. 13 (24%) of patients were treated previously with PR and needed radiotherapy because of PCa recurrence after a median time of 5 (3-9) months. 17 (31.4%) patients were treated previously with ADT. Median levels of PSA after radiotherapy follow up were 0.68(0.21-2.54) with 2 (3.7%) patients remaining with high levels of PSA. We didn't find statistically significant relation between initial PSA levels, or after radiotherapy follow up and presence of bone metastasis. Biochemical recurrence of PCa according to PSA was found in all treatment methods even though, less frequently in patients treated with radiotherapy. PSA level wasn't found as a significant predictive factor for severe prognosis of PCa patients. *The authors marked with an asterisk equally contributed to the work.

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The effects of telomerase mediated telomere-targeting novel drug candidate compounds on oxidative DNA damage and DNA repair on A549 cells

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Cancer cells extend their telomeres through the activity of the telomerase enzyme, allowing them to evade cell cycle control checkpoints and achieve immortality. Telomerase expression is present in approximately 85-95% of cancer cells, whereas its activity is absent in almost all somatic cells. Hence, telomerase-mediated telomere-targeted therapies have gained significant attention in recent years. 6-thio-2'-deoxyguanosine (6-thio-dG, aka THIO) and ribo-thio are telomerase substrate precursor nucleoside analogs, they induce telomeric DNA damage and cell death within 72-96 hours in telomerase-positive cancer cell lines when incorporated at telomeric ends by telomerase. The aim of this study is to investigate the effects of novel telomerase mediated telomere-targeting drug candidates on oxidative DNA damage and DNA repair on the A549 non-small cell lung cancer (NSCLC) cell line. The candidate drug molecules, 6-thio-dG and ribo-thio (MAIA Biotechnology, Chicago, USA), were tested on A549 cells at two different concentrations (0.3 μM and 1 μM) for 72 hours. DNA extraction midiprep kit (Qiagen) was used to isolate DNA from untreated and treated A549 cells. Orbitrap LC-MS and LC-MS/MS techniques were used to evaluate their effects on base excision repair (BER) proteins hAPE1 and hPARP1, as well as on the DNA damage marker 8-hydroxy-2'-deoxyguanosine (8-OH-dG). Based on our findings, 6-thio-dG and ribo-thio exhibited a statistically significant increase in 8-OH-dG when compared to the untreated control group, especially at 1 μM concentrations, suggesting the potential for DNA mutations in cancer cells. Furthermore, a notable elevation in hPARP1 and hAPE1 expression was observed in cells incubated with both 6-thio-dG and ribo-thio at 0.3 μM and 1 μM concentrations compared to the untreated control group. Our data suggest that both 6-thio-dG and ribo-thio induce DNA repair pathways in response to the increased DNA damage in cancer cells.

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Potential of laser-irradiated chlorpromazine for triple-negative breast cancer therapy

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Chlorpromazine (CPZ), a well-known antipsychotic, has demonstrated anticancer properties through multiple mechanisms. This study represents a novel approach in triple-negative breast cancer treatment using laser-irradiated CPZ. We aimed to investigate the antitumor activity of CPZ photoproducts generated by laser irradiation on a breast cancer cell model. CPZ hydrochloride solution was irradiated for 5, 10, 20, 40, and 60 min using a 266 nm pulsed Nd:YAG laser. Both laser-irradiated and non-irradiated CPZ solutions were applied to triple-negative breast cancer (MDA-MB-231) and normal breast (MCF-12A) cells for 24 h, at concentrations of 5, 10, 15, 20, and 30 μM. The cytotoxic potential of CPZ photoproducts was assessed using MTT [3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide], LDH (lactate dehydrogenase), Live/Dead, and clonogenic assays, while their antitumor mechanisms were further investigated through ROS production analysis and the expression of PI3K, Akt, and β-catenin. The results revealed a dose-dependent cytotoxic effect of CPZ photoproducts on MDA-MB-231 cells, with significantly higher toxicity compared to non-irradiated CPZ. Less toxicity was observed in normal MCF-12A cells. The cytotoxicity correlated with irradiation time and ROS production, with maximum effects observed at 40 min of laser exposure. At concentrations above 15 μM, irradiated CPZ induced membrane damage and