P75 Is cold atmospheric plasma an option for bladder cancer treatment? In vitro studies

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Guilherme C.B.[1], Neves A.R.[1], Tavares-Silva E.[2], Silva-Teixeira R.[1], Marques I.[1], Figueiredo A.[2], Abrantes A.M.[1], Botelho M.F.[1]

[1]Faculty of Medicine, University of Coimbra, Biophysics Institute, Coimbra Institute for Clinical and Biomedical Research (iCBR) area of Environment Genetics and Oncobiology (CIMAGO), Coimbra, Portugal, [2]Centro Hospitalar e Universitário de Coimbra (CHUC), Department of Urology and Renal Transplantation , Coimbra, Portugal

Introduction & Objectives: Bladder cancer (BC) is the sixth highest incident tumor and the eighth one with the highest mortality in the world. Moreover, it is a solid tumor with high recurrence rates, which current therapies are unable to efficiently eradicate. In last years, plasma, one of the physical states of matter in which a certain portion of the particles is ionized, has been presented with potential for biomedical treatment in wound healing, coagulation and cancer treatment. Thus, our aim was to evaluate the effects of cold atmospheric plasma (CAP), in terms of cytotoxicity and oxidative stress, in human bladder cancer cell lines.

Materials & Methods: An electronic device able to generate high output voltage was designed in our group in order to create CAP, that will be used to irradiate cells. Two BC cell lines, HT1376 (grade 3, carcinoma) and TCCSUP (grade IV, transitional cell carcinoma), were cultured. Cells were seeded in 48 and 24-multiwell plates, at a density of $0.1x10^6$ and $0.3x10^6$ cells/mL, respectively, and left overnight. Then, both cell lines were submitted to CAP treatment. CAP was generated in open air, 2 mm above the surface of the cell cultures medium, during short periods of time (15s, 30s, 60s, 90s and 120s). Protein content was assessed by SRB assay and metabolic activity by MTT assay, performed 24, 48 and 72 hours after treatment. Also, reactive antioxidant and antioxidant defenses studies were performed 2, 6 and 24 hours after treatment.

Results: After CAP treatment, protein content of both cell lines decreased accordingly to the exposure time. By MTT assay, we observed a decreased metabolic activity, also for both cell lines. These results show that CAP treatment was able to induce a significant reduction of total protein content and metabolic activity even after short periods of exposure. In terms of oxidative stress, for TCCSUP cell line, results demonstrate a tendency to increased intracellular production of radical superoxide and a tendency to decreased intracellular production of peroxides. We observed similar tendencies for HT1376 cell line. Nevertheless, we could not observe a significant difference in expression of GSH levels for TCCSUP and HT1376.

Conclusions: The results suggest that CAP can potentially offer a minimally-invasive option that allows specific cell removal without interfering with the whole tissue.

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