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Abstract

Background: Cancer recurrence after resection surgery remains a major problem in non-small cell lung cancer (NSCLC). There is increasing evidence that anaesthetics may increase risk of cancer recurrence and metastasis by stimulating tumour progression via receptors on cancer cells. Dexmedetomidine is an α_2-adrenergic receptor (α_2-AR) agonist that is a widely used sedative and analgesic in cancer patients. However, the α_2-AR has been shown to increase cell proliferation in numerous cell lines. To ensure its safety in lung cancer patients, this study investigated the effects of dexmedetomidine on lung cancer cell proliferation and migration *in vitro*. We also looked at the effects of dexmedetomidine on cisplatin-induced apoptosis of lung cancer cells.

Methods: Proliferation of A549 lung adenocarcinoma cells was measured using the 3-(4, 5-dimethylthiazol-2-yl)-2, 5 diphenyl-2H-tetrazolium bromide (MTT) assay. Cell migration was assessed using the scratch assay technique. Flow cytometry with propidium iodide (PI) staining was used to measure apoptosis in cells.

Results: Incubation of A549 lung cancer cells with dexmedetomidine for 24 hours significantly increased proliferation ($p<0.05$) and migration ($p<0.05$) of cells. Dexmedetomidine also increased cisplatin resistance in cells after incubation for 48 hours. Cells treated with both dexmedetomidine and cisplatin had significantly reduced apoptosis ($p<0.01$) compared to those treated with cisplatin alone.

Conclusions: Dexmedetomidine increases lung cancer cell proliferation, migration and resistance to cisplatin in vitro. Further studies looking at the in vivo and long term effects of dexmedetomidine on lung cancer cells are urgently required. This study also highlights a potential role for α_2-AR antagonists in the future of cancer treatment.

Key words: dexmedetomidine, lung cancer, proliferation, migration, cisplatin resistance, alpha2-adrenergic receptor

Publications: pending review