ABSTRACT

Peritoneal metastasis is the most frequent form of distant metastasis and recurrence in gastric cancer, and the prognosis is extremely poor due to the resistance of systemic chemotherapy. Here, we demonstrate that intraperitoneal (i.p.) administration of a green fluorescence protein (GFP)-expressing attenuated adenovirus with oncolytic potency (OBP-401) synergistically suppressed the peritoneal metastasis of gastric cancer in combination with paclitaxel (PTX). OBP-401 synergistically suppressed the viability of human gastric cancer cells in combination with PTX. PTX enhanced antitumor effect of OBP-401 due to enhanced viral replication in cancer cells. The combination therapy increased induction of mitotic catastrophe, resulting in accelerated autophagy and apoptosis. Peritoneally disseminated nodules were selectively visualized as GFP-positive spots by i.p. administration of OBP-401 in an orthotopic human gastric cancer peritoneal dissemination model. PTX enhanced the deep penetration of OBP-401 into the disseminated nodules. Moreover, a non-invasive *in vivo* imaging system demonstrated that the combination therapy of i.p. OBP-401 administration with PTX significantly inhibited growth of peritoneal metastatic tumors and the amount of malignant ascites. Intraperitoneal virotherapy with PTX may be a promising treatment strategy for the peritoneal metastasis of gastric cancer.