Strategy for prevention of local recurrence of pancreatic cancer after pancreatectomy: antitumor effect of gemcitabine mixed with fibrin glue in an orthotopic nude mouse model.

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Abstract:

Background: Pancreatic cancer frequently recurs after operative treatment, resulting in a poor prognosis. Inhibition of proliferation of residual cancer cells is important for improved survival of patients with pancreatic cancer. Fibrin glue (FG) is a biocompatible, adherent hemostat that can deliver high concentrations of anticancer drugs to residual cancer cells. The aim of this study was to evaluate the local antitumor effect of a mixture of gemcitabine (GEM) and FG on pancreatic cancer cells implanted orthotopically in nude mice. Methods: SUIT-2 human pancreatic cells were injected into the tail of the pancreas of nude mice. Seven days later, groups of mice were treated with 80 mg/kg GEM mixed with 0.5 mL fibrin glue (GEM + FG), 0.5 mL FG alone (FG), single intraperitoneal (i.p.) injection of 80 mg/kg GEM (GEM1), i.p. injection of 80 mg/kg GEM weekly for 3 weeks (GEM1,2,3), GEM + FG followed by weekly GEM injections for 2 weeks (GEM + FG + GEM2,3), or i.p. injection of PBS weekly for 3 weeks (controls). Results: Twenty-eight days after cell injections, tumor volumes of groups treated with GEM + FG + GEM2,3, GEM1,2,3, GEM + FG, GEM1, and FG were decreased by 84%, 70%, 62%, 37%, and 10%, respectively, compared to that of control mice. GEM + FG + GEM2,3 had the strongest anticancer effect compared to all other groups ($P < .05$). Additionally, GEM + FG showed a more potent antitumor effect compared to GEM1 ($P < .05$). Survival of mice treated with GEM + FG + GEM2,3 was longer than that of mice in all other groups ($P < .05$). Conclusions: A mixture of GEM and FG was effective in inhibiting the growth of

orthotopically implanted pancreatic neoplasms in nude mice. This procedure may be useful clinically to prevent the local recurrence of pancreatic cancer after pancreatectomy.