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Anticancer effect of nucleoline-aptamer-conjugated gemcitabine loaded atellocollagen (IO401) in pancreatic cancer patient-derived orthotropic xenograft model

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Introduction: We investigated the anticancer effect and systemic effect of the atelocollagen (AC) patch coated nucleoline-aptamer-conjugated Gemcitabine (IO401 patch) by directly implanting to the tumor cell in pancreatic cancer patient-derived xenograft (PDX) model to purpose a future potential adjuvant surgical strategy during curative pancreatic resection for pancreatic cancer.
Methods: Pancreatic cancer PDX model was established. Animals were grouped randomly (7 mice per group) into three types of patch transplantation groups: G1 = Null AC patch, G2 = Gemcitabine AC patch, G3 = IO401 patch. Tumor volume (length × width^2, mm^3), Tumor weight (mg), and Tumor inhibition rate [1-(Ti-To)/(average tumor volume of group) × 100, Ti = endpoint tumor volume, To = start tumor volume] were calculated. Anticancer therapy-related toxicity was evaluated by hematologic and histological findings.
Results: G3 (IO401 patch) showed the most significant reduction of tumor growth and tumor weight comparing with G1 (Null AC patch) and G2 (Gemcitabine AC patch) (p = 0.014, p = 0.018). G3 also showed the most significant tumor inhibition rate comparing with G1 and G2 (p = 0.011). G2 and G3 has the low necrosis proportion in histological finding comparing with G1 (p = 0.005, p < 0.05). Moreover, no leukopenia, no anemia, and no neutropenia were observed in G3.
Conclusions: We demonstrated the anticancer effect of the IO401 patch by directly implanting to tumor cell in pancreatic cancer PDX model. This directaly implantable aptaber-drug conjugate system on tumor cell is expected to be a new surgical strategy to further increase the oncological importance of margin negative resection in pancreatic cancer surgery. Further research will be needed.

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