Viability loss and ultrastructural changes on protoscolices of human hydatid cysts induced by retinoic acid

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Abstract:

Surgical removal of intact hydatid cyst is the most effective treatment for hydatid disease. Recurrence of hydatid cyst is mainly due to dissemination of protoscolices (PSCs) rich fluid during the surgical operation. Therefore, preoperative instillation of a scolicidal agent into the cyst is a common practice with adverse side effects of the used drugs. All-trans retinoic acid (atRA) is the physiological mediator of most of the functions of vitamin A, particularly as a cellular differentiation and apoptosis regulating factor. We hypothesized that instillation of atRA could provide an alternative safe scolicidal approach. We tested the scolicidal effects and ultrastructural changes imposed by atRA on human hydatid cyst PSCs in vitro. Freshly isolated hydatid cyst PSCs were subjected to atRA (at 16.7, 1.67, 0.167 µM and 16.7 nM/L). Changes in protoscolices viability (0.1% eosin exclusion) and morphology (scanning and transmission electron microscopy; SEM and TEM) were investigated. Dose-dependent PSCs death within few minutes to 7 days of exposure to atRA was observed. SEM demonstrated ultrastructural damages including rostellar disorganization, loss of hooks and distortion of hooks morphology. TEM revealed loss of the integrity of the internal tissues of PSCs, an increased vacuolization, formation of large lipid droplets in the distal cytoplasm and aberrant, rounded abnormally large sized mitochondria. atRA is a promising alternative to the available synthetic and chemical scolicidal agents. However, in vivo scolicidal activities of atRA and the possible side effects necessitate further studies

Keywords:

Hydatid cyst, protoscolices, retinoic acid, ultrastructure, scolicidal activity.

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