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***Pancreatic Shear Wave Elastography in Children and Adolescents with Type 1 Diabetes;
Relation to Pancreatic Residue***

Authors

Nouran Yousef Salah¹, Sherihane Said Madkour², Khaled Sayed Soliman²

1 Pediatrics Department, Faculty of Medicine, Ain Shams University, Cairo, Egypt

2 Radiology Department, Faculty of Medicine, Ain Shams University, Cairo, Egypt

Abstract

Background: Shear wave elastography (SWE) has emerged as a tool of pancreatic stiffness assessment in chronic pancreatitis and pancreatic cancer with few studies assessing it in diabetes. The role of SWE in assessment of pancreatic tissue stiffness and its relation to pancreatic residue is obscure. *Objective:* To compare the pancreatic SWE in children with type 1 diabetes mellitus (T1DM) to healthy controls and to correlate it to diabetes-duration, glycemic control (HbA1C) and functional B-cell reserve (fasting C-peptide). *Methods:* Fifty children with T1D were compared to 50 controls regarding diabetes-duration, insulin therapy, fasting C-peptide, HbA1C and Pancreatic SWE was measured using logic-P9GE ultrasound-system. *Results:* The mean SWE of the studied children with recent-onset T1D is 4.81 ± 0.62 KPa, those with long standing T1D is 7.10 ± 1.56 KPa, while that of the controls is 5.57 ± 0.27 KPa ($p < 0.001$). SWE was positively correlated to diabetes duration ($p < 0.001$) among children with T1D. Moreover, it was negatively correlated to fasting c-peptide ($p < 0.001$). Diabetes-duration, fasting C-peptide and HbA1C were the significant independent variables related to SWE increase by multivariable regression analysis. *Conclusion:* Significant SWE changes occur during the progression of T1DM being lowest in those with recent onset T1DM and highest in those with longstanding T1DM, that is correlated with pancreatic β -cell reserve.

Key words: Pancreas; Children and Adolescents; Elastography; Type 1 Diabetes Mellitus; C-Peptide.