Role of Collagen Type IV in the Pathogenesis of Increased Prenasal Thickness in Down Syndrome Fetuses: Sonographic & Immunohistological Findings

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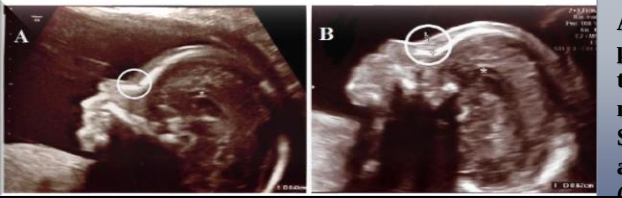
Background: The present study aims to compare the presence and localization of collagen type IV in the prenasal tissue of fetuses with and without Down's syndrome (DS).

Study design: Products of conception were obtained from mid gestation uterine evacuations,
14 and 15 DS and normal fetuses, respectively, were recruited.
Following meticulous microdissection of the prenasal area, an analysis of the prenasal tissue specimens were performed by a single pathologist, blinded to the karyotype results.

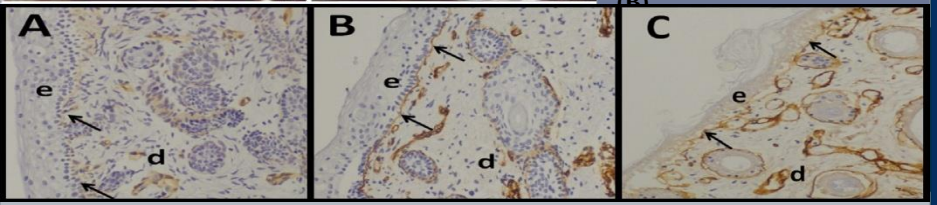
Outcome measures: Immunohistological presence and localization of type IV collagen was analyzed in the basement membrane (BM), blood vessels, and stroma of the tissues.

Results: There were no statistically significant differences in the presence and localization for collagen IV in the blood vessels and stroma between the two groups. However, presence and localization of type-IV collagen in the BM of the prenasal skin were significantly higher in DS specimens compared to the control group (P=0.023). When combining both groups, a significant correlation was found between the increased prenasal thickness and the high presence and location of collagen type IV, irrespective of the karyotype results (Spearman's Correlation; R=0.459; P=0.012).

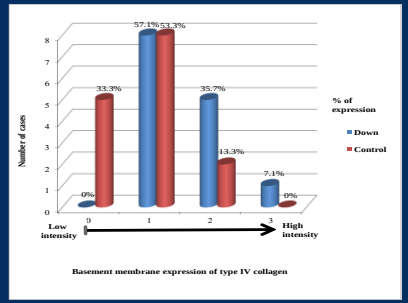
***Conclusion*:** Using the immunohistochemistry technique, we were able to confirm the over expression of collagen type IV in the BM of the prenasal area. This may explain the sonographic finding of increased prenasal thickness (PT) seen mainly in DS fetuses



Appropriate caliper placement of the prenasal thickness measurement in a mid-sagittal fetal profile. Scan of an unaffected (A) and Down syndrome fetuses (B)



Immunostaining for collagen type IV of the skin specimen from the prenasal area. (A) Unaffected case including the epidermis (e), dermis (d). Note weak intensity (+1) of positive staining along epidermal basement membrane (arrow) (B) Down syndrome case. Note moderate intensity (+2) along epidermal basementmembrane (arrow) (C) Down syndrome case. Note strong intensity (+3) along epidermal basement membrane (arrow) (A-C Original magnification×200)



Immunoreactivity of collagen type IV in the basement membrane level both in the unaffected and Down syndrome cases.
Note the proportion of low, low-medium, medium-high and high intensity found in both groups.