Cholesteatoma - The Neoangiogenesis in Adults and Children

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Introduction

Cholesteatoma is a pathologic condition comprising the presence of actively growing and desquamating stratified squamous epithelium within the middle ear cavity. The epithelium is surrounded by connective tissue, containing collagen fibers, fibrocytes and inflammatory cells-named perimatrix. Annual incidence of cholesteatoma ranges around 9 in 10000 in adults and it is more predominant in male.

Angiogenesis occurs both in fetal tissues and in adults. The adult vasculature reis normally quiescent, with some exceptions concerning reproduction and wound healing. Among the great number of angiogenic factors, VEGF family members are considered to play a major regulatory role both of physiological and pathological angiogenesis, as well as in lymphangiogenesis.

Material

Patients n14 archival formalin-fixed paraffin-embedded biopsies from patients with cholesteatoma: 5 with pediatric cholesteatoma-3 of which boys with age of 7 and 15 years and 9 adults-n6 females and 6 males. Age of adult patients ranges from 9 to 90 years (mean age of 46.323, median of 45 years)

Method

Immunohistochemical: n Standard streptavidine-biotin-peroxidase complex technique: n Primary antibodies: mouse monoclonal antibody to human CD31, clone G18 (1:300 in 0.3% BSA in PBS) and rabbit polyclonal antibody to human VEGF (1:200 in 0.3% BSA in PBS) nDetection system: Strept AB Complex /HRP Duet, Mouse/Rabbit kit. Chromogen: - 3,3'- diaminobenzidine (DAB)

Results

In the current study we observed increased angiogenesis in granulation tissue of cholesteatoma compared to the adjacent normal skin of the auditory meatus. Our results are in line with the results of other research groups and confirm the role of angiogenesis in the growth of cholesteatoma.

As found in our study, many structures and cells in parimatrix of cholesteatoma, such as inflammatory cells, sweat and adipose glands, are VEGF-positive. We suggest that VEGF, released by these parimatrix components and by squamous epithelium has a key role in the induction of active angiogenesis in cholesteatoma which supports the pathological granulation angiogenesis in cholesteatoma wich supports the pathological granulation tissue growth.

The pediatric cholesteatoma, appearing in children, is considered to have different clinical behavior than that in adults. In our cases there were much more CD31-positive blood vessels compared to the cases from adults. Many of these vessels were large and resembled cavernous structures. The vessels were also VEGF highly positive. Based on this we suggest that intensive angiogenesis in pediatric cholesteatoma supports more aggressive clinical behavior than cholesteatoma in adults.

Summary Points

The numbers of CD31-positive blood vessels as well as the level of expression of VEGF in the granulation tissue of cholesteatoma were higher than in the adjacent normal skin of the auditory meatus. The studies characteristics of the active angiogenesis were markedly enhanced in the specimens from pediatric cholesteatoma

Conclusion

Based on our observations we suggest that intensive angiogenesis in pediatric cholesteatoma supports more aggressive clinical behavior than cholesteatoma in adults.