Bifid Uvula and Otitis Media in Apache Indians

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The association of bifid uvula with otitis media and scarred tympanic membrane was studied in White Mountain Apache Indians at Canyon Day, Arizona. Of 349 persons seen during a survey for otitis media, 13.5 percent had clinical otitis media, and 64.2 percent had scarring of the tympanic membrane of the otoscopically worse ear; 20.3 percent had bifid uvula. Bifid uvula was not associated with clinical otitis media or scarred tympanic membrane.

Current thinking universally associates cleft palate with otitis media. Cleft palate, submucous cleft, and bifid uvula are thought to be associated with a eustachian tube difference that predisposes to otitis media (Bluestone, 1983; Doyle et al, 1980). Taylor's (1972) landmark plea for awareness that bifid uvula is related to otitis media was based on observations of patients seen in his "clinical practice devoted primarily to otology." The high rates of occurrence of otitis media and palatal cleft conditions in Native Americans have been used to support the argument that these conditions are interrelated (Todd, 1983; Todd and Bowman, 1985; Wiet, 1979). However, documentation concerning the strength of the relationship of bifid uvula to the otitis media condition is lacking.

This report addresses two questions: first, the prevalence of otitis media and tympanic membrane scarring in a group of White Mountain Apache Indians; second, the association of these abnormal otoscopic findings with bifid uvula.

MATERIALS AND METHODS

In May 1983, 366 residents of Canyon Day, Arizona, (population 760) voluntarily participated in a 16-year follow-up cross-sectional survey assessing otitis media. The age range was 1 month to more than 80 years. The surveyed persons had clinical otitis media at a similar rate to that found 16 years earlier, but the manifestations were less impressive (Todd and Bowman, 1985).

Pneumatic otoscopy was performed by two otolaryngologists. The palates were inspected with head-light illumination and tongue depressor. At any question of bifidity, the uvula was palpated with a smooth ring ear currette to aid in the visual assessment. The posterior border of the bony plate was not palpated. Seventeen persons were excluded from this study: six did not allow palate inspection; eight had bilateral cerumen obscuration that could not be removed with available equipment; and three had obvious craniofacial syndromes (cleft palate, unilateral microtia, and fetal alcohol syndrome). Unilateral cerumen impaction could not be removed in five persons; the status of the viewed contralateral ear was used for data analysis.

The tympanic membrane findings were classified as follows:

I. Normal.
II. Scarred:

A. Fibrotic, defined as whitish, thickened opaqueness of increased fibrous tissue.

B. Atrophic, defined as thin, transparent areas with increased mobility at pneumatic otoscopy; no size restriction was used.

C. Sclerotic, defined as diffuse white or yellow chalky plaques. (These three sub-groups are not mutually exclusive: different types of scarring could be found in the same ear. In such cases, the more severe pathology [sclerotic more

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severe than atrophic, atrophic more severe than fibrotic] was used as the basis for classification.)
III. Clinical otitis media, defined as cholesteatoma, tympanic membrane perforation (including myringotomy-tube), middle ear effusion, atelectatic otitis, or acute otitis media (Rudin et al, 1983).

Each examiner evaluated approximately one-half of the persons; both examiners independently assessed 7.1 percent (26/366) of the persons. The inter-observer agreement, for the 52 ears examined by both observers, was 100 percent for clinical otitis media, normal tympanic membrane, and presence of tympanic membrane scarring (the more severe type of scarring was noted by each examiner). For bifid uvula, the inter-observer agreement was 88 percent (23/26): the three disagreements were in persons thought by one or the other examiner to have notched tip of the uvula. (These three persons were classified as having bifid uvula for data analysis.)

The bifid uvula-tympanic membrane association was calculated using one person as the statistical unit and classifying each person according to the more severe ear pathology found in either ear (Miller et al, 1983).

RESULTS

Strong bilaterality of tympanic membrane findings is shown in Table 1. If an impressive otoscopic abnormality was noted in one ear, then a similarly impressive abnormality was usually noted in the other ear. All three types of scar were found in the worse ear of sixteen patients, and two types in ninety-eight. Considering each person's otoscopically worse ear, 13.5 percent had clinical otitis media, 64.2 percent had scarring, and 22.3 percent were normal.

The 20.3-percent occurrence of bifid uvula was almost identical in persons with clinical otitis, in persons with each category of tympanic membrane scarring, and in persons with normal tympanic membranes (Table 2). Neither the presence nor the extent of bifid uvula was found to be associated with the otitis media condition. No muscular diathesis of the soft palate was identified in any of these persons. No age or sex correlate with palatal cleft or otoscopic finding was apparent.

DISCUSSION

These Canyon Day data may be observer-biased toward the finding of bilaterality of otitis media conditions and the association of the otitis media condition with palatal cleft: one of the authors has reported such an association (Todd, 1983). However, the bilaterality findings are essentially identical to the findings of Rudin et al (1983) in Sweden. If observer bias were operative in this Canyon Day data, an association of tympanic membrane abnormality and bifid uvula would be expected. Because of the high incidence of otitis media in this population, the number surveyed may not have been large enough to demonstrate adequately an association with bifid uvula.

How valid is the assumption that a scarred tympanic membrane is attributable to prior clinical otitis media? Certainly, local tympanic membrane trauma and inflammation can prompt scarring. However, as Tos et al (1984) have shown, "The long-lasting negative pressure and the inflammatory changes of the eardrum in secretory otitis are probably the main causes of all kinds of eardrum abnormality...." Abnormal otoscopic and tympanometric findings were usually found in children 6 to 8 years of age with a history of otitis media beginning in infancy, in a prospective study of Apache children (Fischler et al, 1984). Nevertheless, eardrum findings are not static over time and are well known to change to better or worse (Tos et al, 1984; Møller, 1984). In addition to atrophic and tympanosclerotic abnormalities of the eardrum, clinical and experimental data suggest that fibrosis be considered an abnormality (Myerhoff and

TABLE 1 The Distribution of Left-Sided and Right-Sided Tympanic Membrane Findings in Apache Indians at Canyon Day, Arizona

	Left Ear					
Right Ear	*Normal*	*Fibrotic**	*Atrophic**	*Sclerotic**	*Otitis Media*	*Total*
Normal	78	16	2	1	1	98
Fibrotic*	8	90**	23	0	6	127
Atrophic*	1	22	26	7	6	62
Sclerotic*	0	4	7	17	3	31
Otitis media	1***	6	4	4	16	31
Total	88	138	62	29	32	349

* These groups are mutually exclusive: for ears with more than one type of scar, entry in the table is for the more severe pathology (sclerotic more severe than atrophic, atrophic more severe than fibrotic).
** Four of these persons had healed postoperative ears.
*** This person had a traumatic perforation.

TABLE 2 The Relation of Bifid Uvula and Tympanic Membrane Findings

	Otoscopically Worse Ear					
Bifidity	*Normal*	*Fibrotic**	*Atrophic**	*Sclerotic**	*Otitis Media*	*Total*
> ⅓ of uvula	0	6	2	0	0	8
≤ ⅓ of uvula	11	19	17	9	7	63
None	67	84	59	28	40	278
Total	78	109	78	37	47	349

* These groups are mutually exclusive: for ears with more than one type of scar, entry in the table is for the more severe pathology (sclerotic more severe than atrophic, atrophic more severe than fibrotic).

Shea 1984). We presume "silent" (not coming to clinical attention) otitis media can prompt tympanic membrane scarring. Conversely, we have seen children with recurring acute otitis media who subsequently have normal tympanic membranes at otoscopy.

The rate of bifid uvula in these Apaches is similar to the 18.8 percent found in Navajo children (Shapiro et al, 1971). Each population is of Athabaskan ancestry. The rates are markedly higher than the 1 percent found in a massive school survey in Denver (Weatherly-White et al, 1972), and the 3 percent reported in a suburban pediatric office in Washington, D.C. (Shprintzen et al, 1985). Although no classic submucous cleft was found in our survey at Canyon Day, one wonders if flexible nasopharyngoscopy would reveal occult submucous cleft palate and hypoplasia of the eustachian tube, as Shprintzen et al described in 21 of 25 children with bifid uvula.

Bifid uvula may be a minimal expression of the continuum of the clefting process (Shapiro et al, 1971; Cotton and Nuwayhid, 1983). However, bifid uvula is probably not indicative of the same severity of eustachian tube problem and otitis media as overt cleft palate and submucous cleft palate (Shprintzen et al, 1985). Three series, in none of which would silent otitis media have been identified, suggest similar rates of middle ear disease in bifid uvula and intact uvula children: Shprintzen et al (1985) found a history of middle ear disease in only 12 out of 25 (48 percent) of their bifid uvula patients; Schwartz et al (1985) found children with bifid uvula to have a slight, but not statistically significant, increased occurrence of otitis media; and we have found (unpublished data from Fischler, Todd, and Feldman, 1985) that bifid uvula does not correlate with clinical encounters of otitis media in Apache Indian children at San Carlos, Arizona.

Finally, we are surprised that the 20.8-percent incidence of palatal cleft at Canyon Day is so similar to the 26.9-percent (39/134) incidence of cleft in Arizona Indian patients having surgery for otitis media (Todd, 1983).

CONCLUSION

Bifid uvula does not appear to associate with otitis media.

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