Role of Arteriosclerosis in Development of and Recovery from Sudden Deafness and Therapeutic Effects of Lipo-PGE₁

Eiji Kondo¹⁾, Ikuji Kawata¹⁾, Tsukasa Takaishi²⁾, Ritsuko Abe³⁾,
Yoji Hori⁴⁾, Masakazu Goda⁵⁾, Aki Shimada⁵⁾ and Noriaki Takeda⁵⁾

In order to clarify the role of arteriosclerosis in the development of and recovery from sudden deafness, we evaluated arteriosclerosis in patients with sudden deafness, using pulse wave velocity (PWV) as a marker. Arteriosclerosis was observed in 69% of the sudden deafness patients and the initial hearing level in the patients with arteriosclerosis was worse than those without arteriosclerosis. After treatment with a steroid and lipid microsphere-incorporated prostaglandin E₁ (lipo-PGE₁), the recovery rate of the patients with arteriosclerosis was significantly lower than those without arteriosclerosis. These findings suggest that arteriosclerosis is an exacerbating condition and a poor prognostic factor in patients with sudden deafness. On the other hand, PWV in the patients with arteriosclerosis who recovered tended to decrease after the treatment, suggesting that the circulation-improving effect of lipo-PGE₁ may contribute to the recovery of the hearing loss related to arteriosclerosis.

Keywords : arteriosclerosis, sudden deafness, lipo-PGE₁, pulse wave velocity (PWV)

References

- Gussen R : Sudden deafness of vascular origin: a human temporal bone study. *Ann Otol Rhinol Laryngol* **85**: 94-100, 1976.
- Schuknecht HF, Benitez J, Beekhuis J, et al. : The pathology of sudden deafness. *Laryngoscope* **72**: 1142-1157, 1962.
- Saunders WH : Sudden deafness and its several treatments. *Laryngoscope* **82**: 1206-1213, 1972.
- Wilson WR, Byl FM and Laird N : The efficacy of steroids in the treatment of idiopathic sudden hearing loss. A double-blind clinical study. *Arch Otolaryngol* **106**: 772-776, 1980.
- Kubo T, Matsunaga T, Asai H, et al. : Efficacy of defibrinogenation and steroid therapies on sudden deafness. *Arch Otolaryngol Head Neck Surg* **114**: 649-652, 1988.
- 神崎 仁, 斎藤成司 : 突発性難聴に対するプロスタグランディンE₁の点滴静注療法. *耳鼻展望* **27** 補1: 103-106, 1984.
- 荒井親雄, 長谷川元治 : PWV 法. *動脈硬化症研究の進歩* **11**: 17-30, 1990.
- 小澤利男, 増田善昭 : 脈波速度測定法. 脈波速度. 30-32 頁, メジカルビュー社, 東京, 2002.
- Cadoni G, Scorpecci A, Cianfrone F, et al. : Serum fatty acids and cardiovascular risk factors in sudden sensorineural hearing loss: a case-control study. *Ann Otol Rhinol Laryngol* **119**: 82-88, 2010.
- 鈴木賢二, 森 誠, 榎谷直司, 他 : 動脈硬化に関する疫学的研究 (1) 一大動脈脈波速度と高血圧, 眼底動脈病変動脈硬化性変化, 虚血性心電図変化との関連. *動脈硬化* **23**: 715-720, 1996.
- 清川重人, 原本俊一, 玉手純子, 他 : PG 含有リピッドマイクロスフェアの動脈硬化部位へのターゲティング. *Drug Delivery Syst* **2**: 35-40, 1987.
- 笹木 収, 寺沢和貴 : 突発性難聴に対するリポ PGE₁ の使用経験. *新薬と臨* **39**: 363-368, 1990.
- Asmar R : Arterial stiffness and pulse wave velocity. pp 17-18, Elsevier SAS, Paris, 1999.

-
- Department of Otolaryngology, Anan Kyoei Hospital
  - Department of Otolaryngology, Tokushima Municipal Hospital
  - Department of Otolaryngology, Oe Kyodo Hospital
  - Department of Otolaryngology, Tokushima Prefectural Central Hospital
  - Department of Otolaryngology, University of Tokushima School of Medicine

Corresponding Author Address : Eiji Kondo
siverianj@yahoo.co.jp

A comparison of the recovery rate in sudden deafness patients with or without arteriosclerosis.

	No.	Mean Age	Mean IHL	Recovery Rate
Arteriosclerosis (+) (baPWV $\geq$ 1400 cm/s)	20 (69%)	66.9 yr* (56-78)	64.8 dB	35.0%** (7/20) CR 4 MR 3
Arteriosclerosis (-) (baPWV < 1400 cm/s)	9 (31%)	47.9 yr* (17-67)	56.5 dB	77.8%** (7/9) CR 6 MR 1
Total	29	61.0 yr (17-78)	62.2 dB	48.3%** (14/29) CR 10 MR 4

*P < 0.05, **P < 0.05

IHL = initial hearing level

CR = complete recovery   MR = marked recovery

The therapeutic effects of a steroid and lipo-PGE₁ and the change of PWV in the treatment of sudden deafness.

		No.	baPWV decrease	baPWV increase or no change
Arteriosclerosis(+) (baPWV $\geq$ 1400 cm/s)	CR+MR	7	5 (71.4%)	2 (28.6%)
	SR+NC	13	7 (53.8%)	6 (46.2%)
Arteriosclerosis(-) (baPWV < 1400 cm/s)	CR+MR	7	3 (42.9%)	4 (57.1%)
	SR+NC	2	1 (50.0%)	1 (50.0%)
Total		29	16 (55.2%)	13 (44.8%)

CR = complete recovery   MR = marked recovery   SR = slight recovery   NC = no change