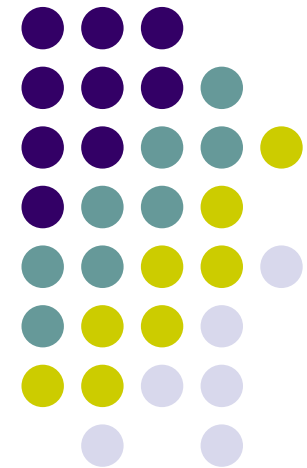


Idiopathic sudden sensorineural hearing loss

Evidence Based Medicine

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Formining Clinical Question



- *Patient*
 - 35 y/o female with sudden attacked of right side deafness (>90dB)
- *Intervention*
 - Treatment with oral steroids
- *Comparison*
 - No treatment
- *Outcome*
 - Hearing recovery

Sudden sensorineural hearing loss (SSNHL)



- Definition
 - Idiopathic hearing loss
 - At least 30dB
 - At least 3 test frequency
 - Within 3 days

- *US National Institute for Deafness and Communication Disorders*



Idiopathic SSNHL

- Diagnosis of exclusion
 - Infections
 - Ototoxic drugs
 - Neoplasms: cerebellopontine angle tumors
 - Trauma: noise-induced hearing loss
 - Autoimmune disease
 - Multiple sclerosis
 - Perilymph fistula



Idiopathic SSNHL

- Epidemiology
 - 2-20 /100000
 - Men = Women
 - Right = Left
 - 30-60 years-old
 - Unilateral: 90%
- Risk Factor
 - Uncertain



Idiopathic SSNHL

- Etiology
 - Viral inflammation of the cochlea or CNVIII
 - Influenza B, mumps, measles, rubella, CMV, VZV
 - Histopathologic findings:
 - Hair cell loss, ganglion cell loss, strial atrophy, inflammatory cochleitis
 - Vascular events
 - Thrombosis
 - Hemorrhage
 - Vascular spasm



Treatment

- Oral corticosteroids
- Antiviral drugs
- Vasoactive and hemodilution therapy
- Plasma expander
- MgSO_4
- Hyperbaric oxygen



Oral corticosteroids

- Action
 - Decreased inflammation and edema
 - Special action in cochlea: uncertain
- Side effect
 - Glucose intolerance
 - Hypertension
 - Adrenal suppression
 - Gastrointestinal bleeding
 - Altered mental states

Wilson 1980 {published data only}

Wilson WR, Byl FM, Laird N. The efficacy of steroids in the treatment of idiopathic sudden hearing loss. *Archives Otolaryngology* 1980; **106**(12):772–6.

Methods	Double-blinded. It is unclear whether randomisation took place in this study and if so the methodological quality has not been described.
Participants	Setting: Two different centres, conducted by two different investigators. (Kaiser-Permanente (K-P), Oakland and Massachusetts Eye and Ear Infirmary (MEEI), Boston) Country: USA Total number: 119 (K-P: 27 MEEI: 92) Mean age: Not known Male to Female ratio: not mentioned Tinnitus (no. of patients): not mentioned Vertigo: K-P 61% and MEEI 33% Duration of treatment: K-P 10 days; MEEI 12 days
Interventions	K-P Treatment group: oral methylprednisolone 12 days Control group: placebo MEEI Treatment group: oral dexamethasone 10 days Control group 1: placebo Control group 2 : no treatment
Outcomes	Outcome measures: objective audiometry performed on admission, at four weeks and three months after the onset of hearing loss. A “complete recovery” was defined as recovery of hearing to within 10 dB of the unaffected ear speech reception score or averaged pure tone score (if loss was primarily in the high frequency range). A “partial recovery” was defined as recovery of hearing to within 50% or more of the unaffected ear’s speech reception score or averaged pure tone score. A “no recovery” was defined as less than 50% recovery of hearing.
Notes	Quality Score: C
Allocation concealment	C – Inadequate





Critical Appraisal

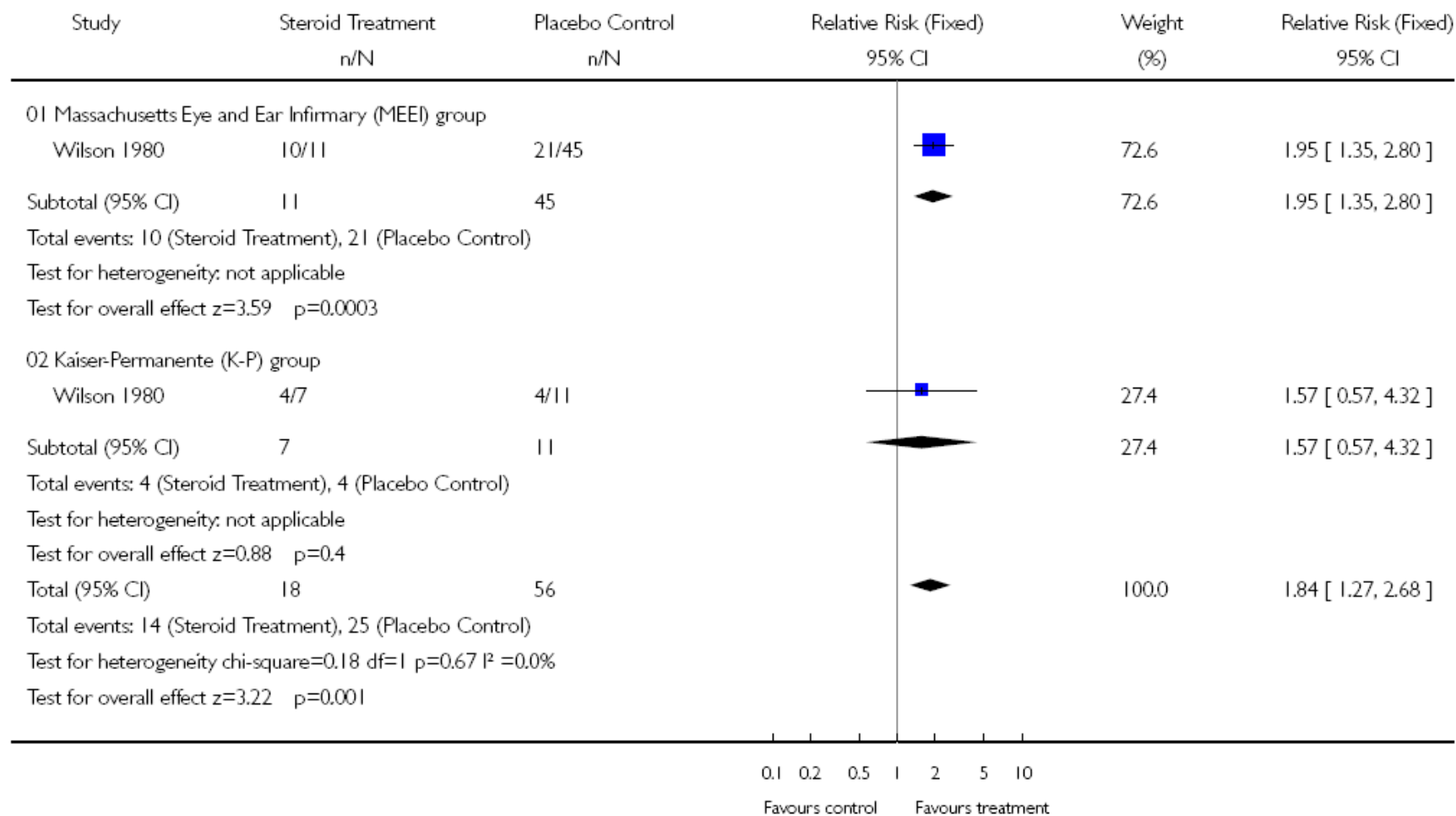
- Allocation Concealment
 - Not mentioned, inadequate
- Randomization
 - Inadequate, selection bias
- Blinding
 - Unclear
- Quality of Intervention
 - Heterogeneity of 2 centers
 - Different potency of drugs
- Loss of follow up/ intention to treat
 - Not achieved
- Quality of Outcome assessment
 - Potential of measurement bias



Review: Steroids for idiopathic sudden sensorineural hearing loss

Comparison: 04 Wilson 1980 study - Recovery by group for steroid-effective zone patients only (see 'Results' section)

Outcome: 01 Hearing recovery (see 'Description of studies' for definition)



Cinamon 2001 *{published data only}*

Cinamon U, Bendet E, Kronenberg J. Steroids, carbogen or placebo for sudden hearing loss: a prospective double-blind study. *European Archives of Oto-Rhino-Laryngology* 2001;**258**(9):477–80.



Methods	Randomised, double-blinded.
Participants	Setting: General community patients suffering from unilateral ISSHL who were referred to Chaim Sheba Medical Center Country: Israel Total number: 41 Mean age: 36 Male to Female ratio: 19/22 Tinnitus (no. of patients): 23 Vertigo(no. patients): 13 Duration of treatment: 5 days
Interventions	Group 1: <u>Prednisone tablet 1 mg/kg once a day</u> Group 2: Placebo tablets (similar to prednisolone tablets) Group 3: Carbogen (5% CO ₂ + 95% Oxygen) inhalation for 30 minutes, six times per day Group 4: Room air inhalation for 30 minutes, six times per day
Outcomes	Outcome measures: objective audiometry performed on admission, on day six and at follow-up (range 14 to 90 days, average 33 days). The authors evaluated and compared the average hearing level at six frequencies (250 to 8000 Hz), the pure tone average of speech frequencies (500, 1000, 2000 Hz) and the high tone average (4000, 8000 Hz). An “improvement” was considered to be a minimum 15 dB change between the average hearing level evaluated at the different times mentioned.
Notes	Quality Score: C
Allocation concealment	C – Inadequate



Critical Appraisal

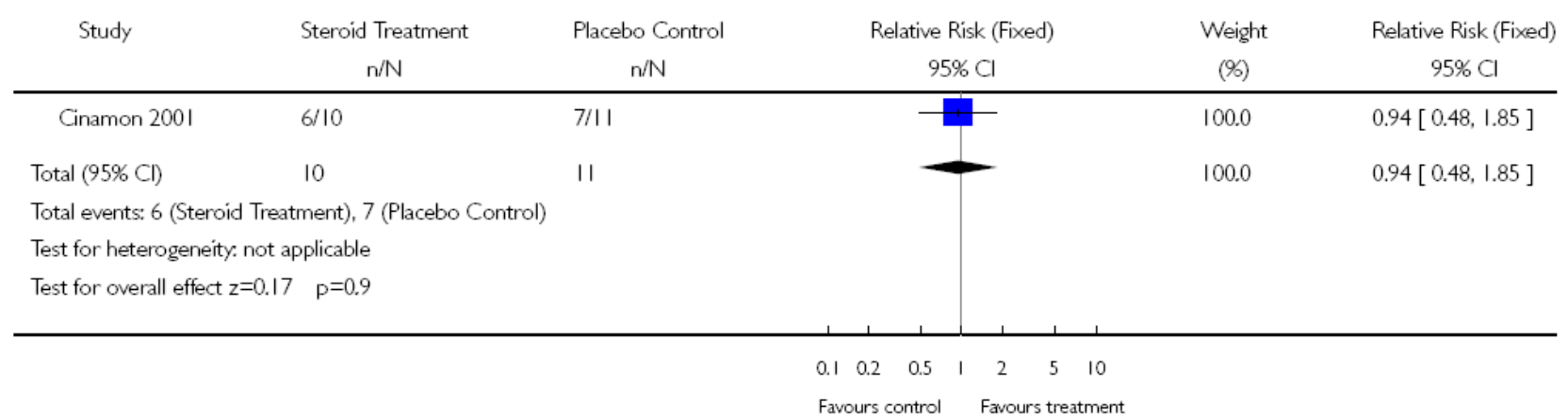
- Randomization
 - Too few participants (41)
- Blinding
 - Adequate
- Loss of follow up/ intention to treat
 - No loss to follow up
- Quality of Outcome assesement
 - Potential of measurement bias



Review: Steroids for idiopathic sudden sensorineural hearing loss

Comparison: 01 Cinamon 2001 study - Effects of oral steroid versus oral placebo immediate post-treatment

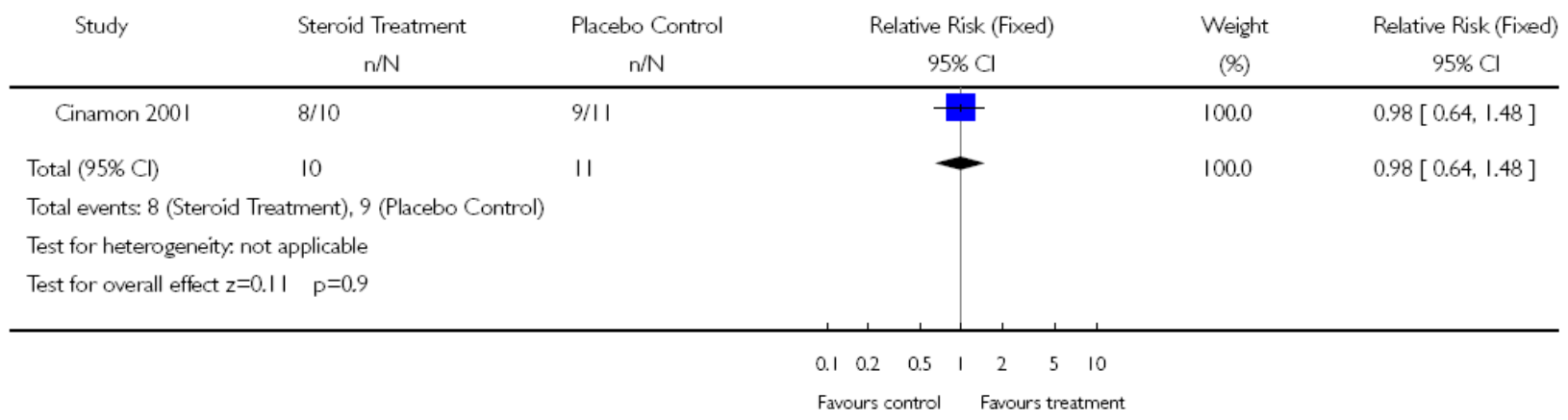
Outcome: 02 Hearing improvement: average hearing level at six frequencies (250 to 8000Hz)



Review: Steroids for idiopathic sudden sensorineural hearing loss

Comparison: 02 Cinamon 2001 study - Effects of oral steroid versus oral placebo at follow-up (14 to 90 days, average 33 days)

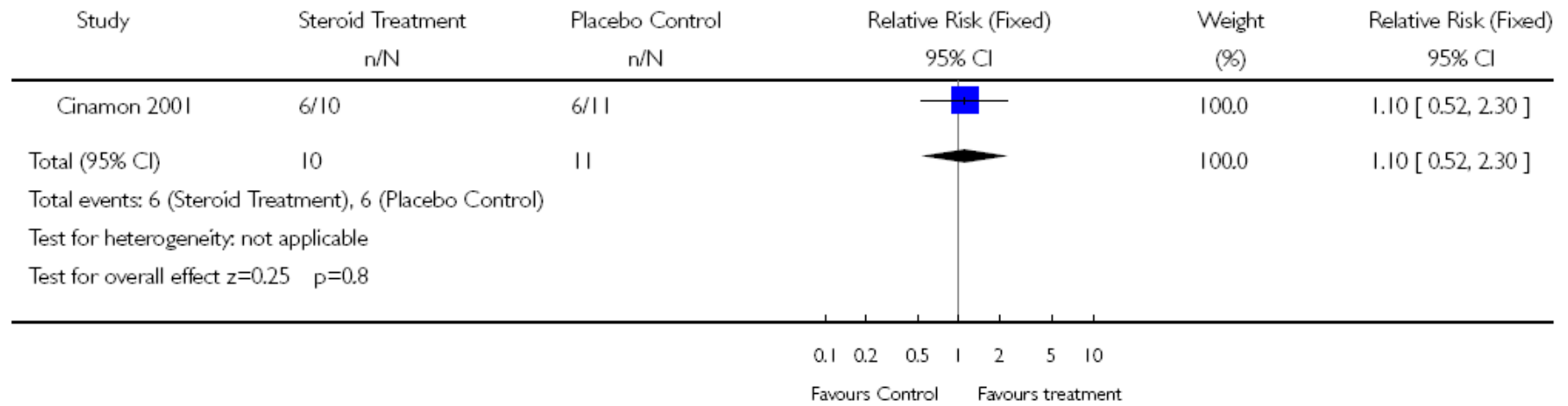
Outcome: 02 Hearing Improvement: average hearing level at six frequencies (250-8000Hz)



Review: Steroids for idiopathic sudden sensorineural hearing loss

Comparison: 01 Cinamon 2001 study - Effects of oral steroid versus oral placebo immediate post-treatment

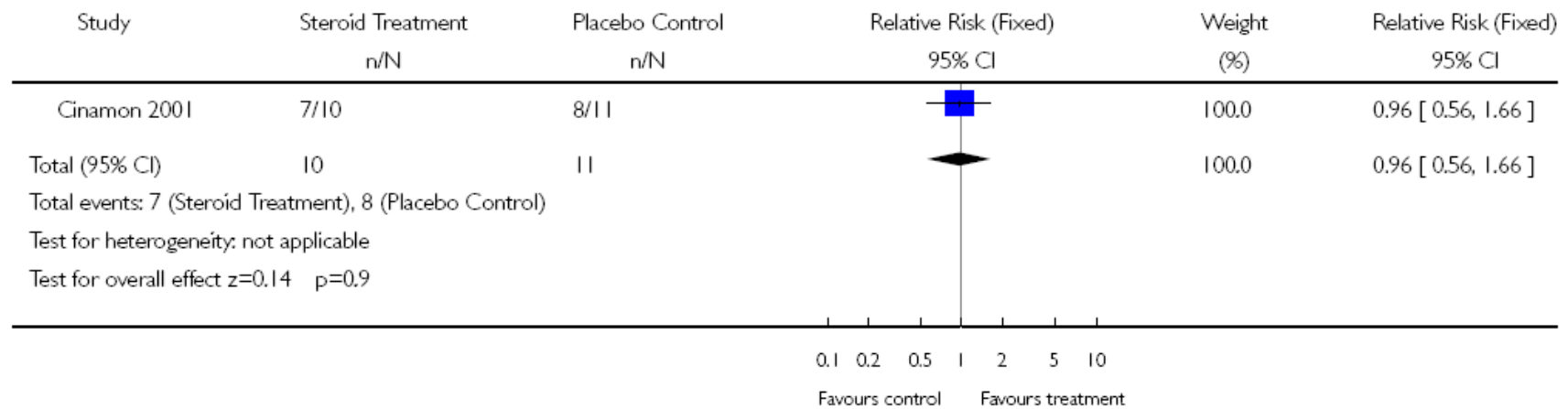
Outcome: 01 Hearing recovery: average speech frequencies (500, 1000, 2000Hz)



Review: Steroids for idiopathic sudden sensorineural hearing loss

Comparison: 02 Cinamon 2001 study - Effects of oral steroid versus oral placebo at follow-up (14 to 90 days, average 33 days)

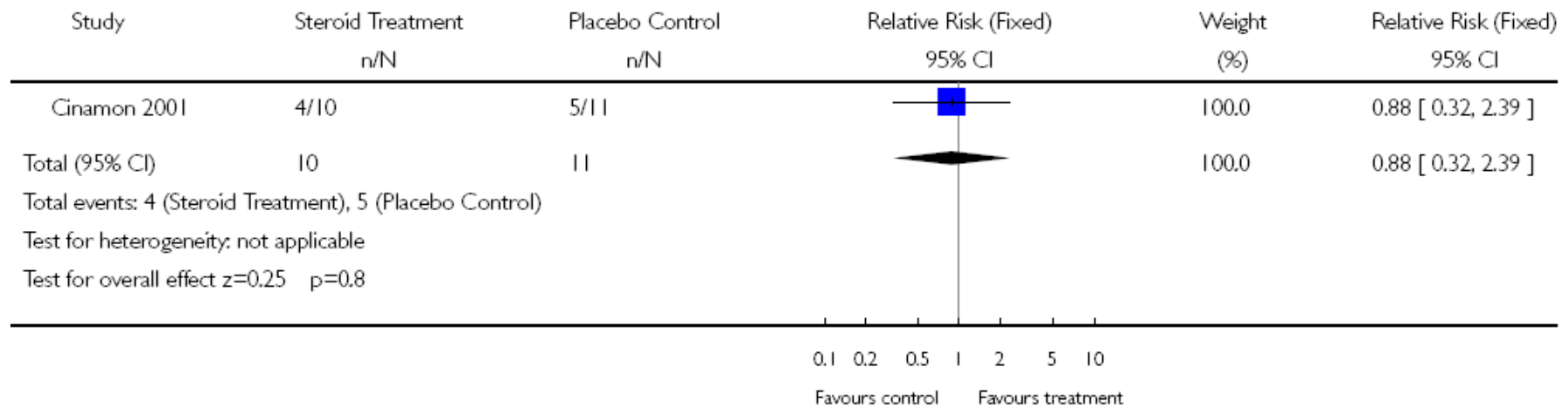
Outcome: 01 Hearing improvement: average speech frequencies (500, 1000, 2000Hz)



Review: Steroids for idiopathic sudden sensorineural hearing loss

Comparison: 01 Cinamon 2001 study - Effects of oral steroid versus oral placebo immediate post-treatment

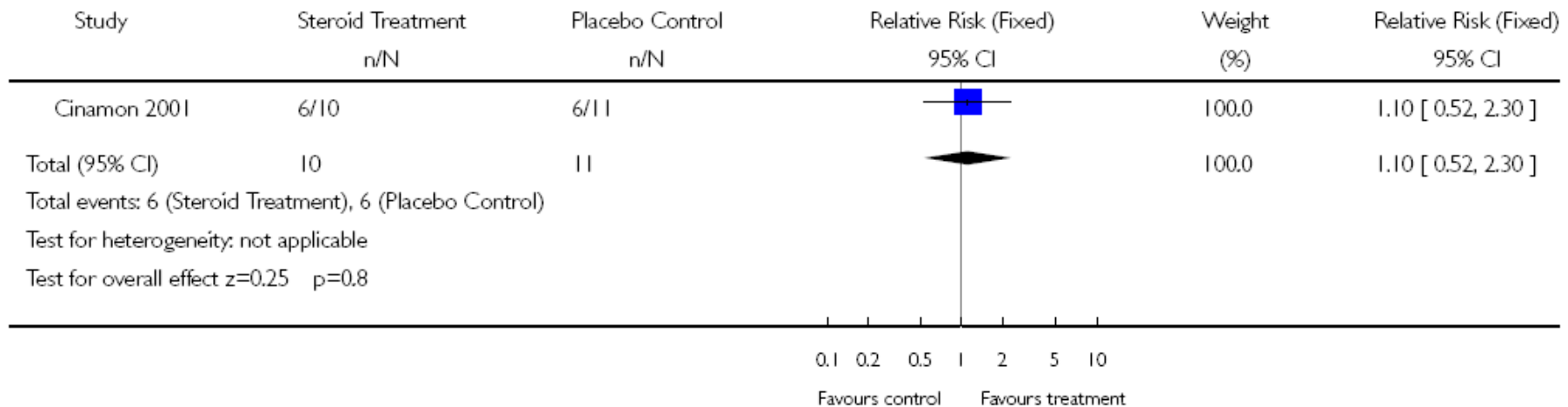
Outcome: 03 Hearing improvement: high-tone hearing level average (4000, 8000Hz)



Review: Steroids for idiopathic sudden sensorineural hearing loss

Comparison: 02 Cinamon 2001 study - Effects of oral steroid versus oral placebo at follow-up (14 to 90 days, average 33 days)

Outcome: 03 Hearing improvement: high-tone hearing level average (4000, 8000Hz)





Intratympanic steroids

Source	Total Population, No.	Definition of SSHL in Decibels/No. of Frequencies/No. of Days	Intervention	Control	Validity Score (of 9)
Ho et al, ²² 2004 (Taiwan)	29	"Severe or profound"/?/3	Intratympanic dexamethasone, 4 mg/mL weekly for 3 wk after 10 d of standard treatment (systemic steroids, carbogen, nicametate, vitamin B) (n = 15)	Nicametate, vitamin B, and fludiazepam after 10 d of standard treatment (n = 14)	4
Intratympanic dexamethasone vs other treatment Ho et al, ²² 2004		PTA was assessed before randomization, and 1 and 4 wk after treatment in patients in whom initial treatment with oral steroids had failed	Statistically significant ($P < .05$) greater rate of recovery (at least 30-dB gain) in the intratympanic dexamethasone group (53.3%) vs control (7.1%) at an undefined time after treatment		

- Has effect in patients without hearing improve after 10 days of oral corticosteroids
- Improvement >30dB
 - IT-Dexamethasone (53.3%) > Control (7.1%) ($p < 0.05$)
- Need more evidence

Summary & Recommendation



- Prednisolone, 60-80mg/day, x 10 days

Grade 2B

- IT-Dexamethasone (4mg/ml, weekly, x 3 weeks) for whom do not show improvement after 10 days of oral corticosteroids

Grade 2B

Thanks for your attention!

