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**Effects of Gentamycin on Pons of Adult Albino Rat***S M Dawar Husain***Abstract**

**Getamicin**, an aminoglycosidic antibiotic, is ototoxic, nephrotoxic and causes neuromuscular blockade as well.

A total of twenty albino rats (10 males and 10 females) were used in the present study, and they were equally divided into control and experimental groups. Experimental group rats received gentamicin intramuscularly for 21 days. Control group rats received normal saline. Then rats of both the groups were anaesthetized with nembutol, 35 mg/kg body wt. and perfused with 10% formalin. 10 $\mu$  thick sections of pons were stained with H&E and Gleys Silver stains. Observation under light microscope revealed degenerative changes.

**Key words:** Albino rats, Pons, Gentamicin, Toxic effects

**Introduction**

Gentamicin is among the group of aminoglycosides that are used to treat aerobic gram negative bacterial infections. Amikacin, kanamycin, neomycin, streptomycin, paromomycin and tobramycin are other antibiotics in this group. The toxicity of these agents is dose related. Aminoglycosidic antibiotics block neuromuscular junction<sup>1</sup>. Gentamicin was introduced in 1958 by Weinstein. It is nephrotoxic, neurotoxic and ototoxic and its side effects include ringing in ears, hearing loss, tinnitus, dizziness and anuria. Study was conducted on pharmacokinetics and dosage requirement of gentamycin in 1640 patients receiving treatment of gram-negative infections (daily dose ranged from 0.5 to 25.8 mg/kg<sup>2</sup> The effects of gentamycin were studied on 1327 patients, of which 31 patients (2.3%) had significant ototoxicity<sup>3</sup> The average frequency of cochlear toxicity for gentamycin was reported to be 8.3% and exact incidence of vestibule-ototoxicity as about 3%<sup>4</sup>. Disequilibrium and ataxia were noted as main symptoms of vestibulotoxicity<sup>5</sup>. The chronic toxicity was related to aminoglycoside-phosphoinositol binding<sup>6</sup>. Evidence of neurotoxicity due to gentamicin and other aminoglycosides is available<sup>7</sup>. A biochemical basis for the inherited susceptibility to aminoglycoside ototoxicity, has also been reported<sup>8</sup>. Greater sensitivity of the auditory cortex to aminoglycosidic antibiotics as compared

to the periphery (cochlea) was reported<sup>9</sup> Gentamycin toxicity was reported to depend on other factors like: dose and kidney function, other potentiating medications, genetic susceptibility and age<sup>10</sup>.

Though the effects on pons have been reported along with ototoxic effects but the neurohistological effects of gentamycin on auditory cortex have less well been documented.

So, the present study is aimed to have further insight into the effects of gentamicin on the histology of the pons, which may explain central cause of ototoxicity.

### **Material and methods**

20 adult albino rats, with equal number of males and females and weighing approximately 130 gms, were used in the present study. They were divided into control and experimental groups. Each group was comprised of 10 rats with equal male and female ratio. Experimental group rats were injected with gentamycin, 135mg/kg of body weight, intramuscularly for 21 days (Gentamycin WHO food Additives series 4, [www.inchem.org/documents](http://www.inchem.org/documents)). Control group rats were treated with normal saline in same volume by intramuscular route for 21 days. After this duration, rats were anaesthetized by injecting nembutol, 35 mg/kg body wt and perfused with buffered 10% formalin. Pons tissue samples were obtained from the brain. Tissue samples were processed for paraffin embedding. Then 10 $\mu$  thick sections were obtained with rotatory microtome. Sections were stained with H&E and Glee's Silver stains for observation under light microscope.

### **Observations**

In low power Glee's silver stained cross sections of pons, the control group (Fig1), well stained & lightly stained bundles of fibres, while the experimental group rats (Fig 2).showed disorganization & breaking of fibres..

In high power Glee's silver stained cross sections of pons, in the control group (Fig 3), well stained organised nerve fibre bundles were seen, while in the experimental group (Fig 4), breaking & swelling as well as loss of continuity of nerve fibres with disappearance of pontine nuclei were observed.

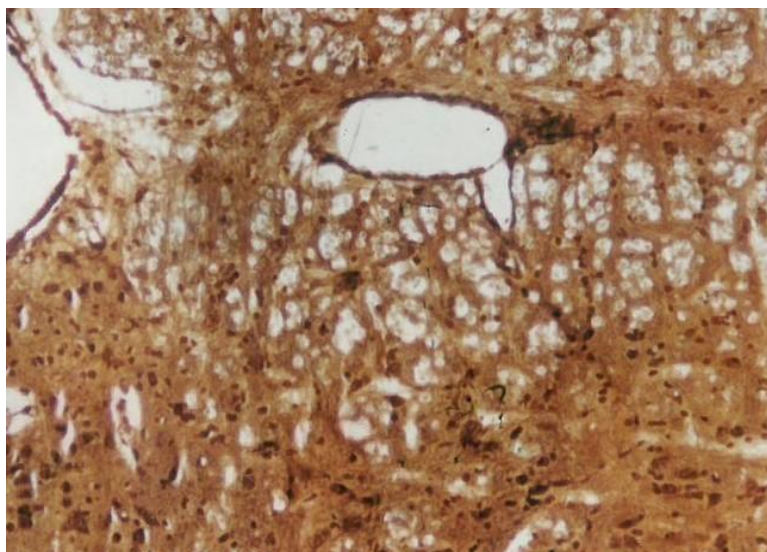


Fig. 1

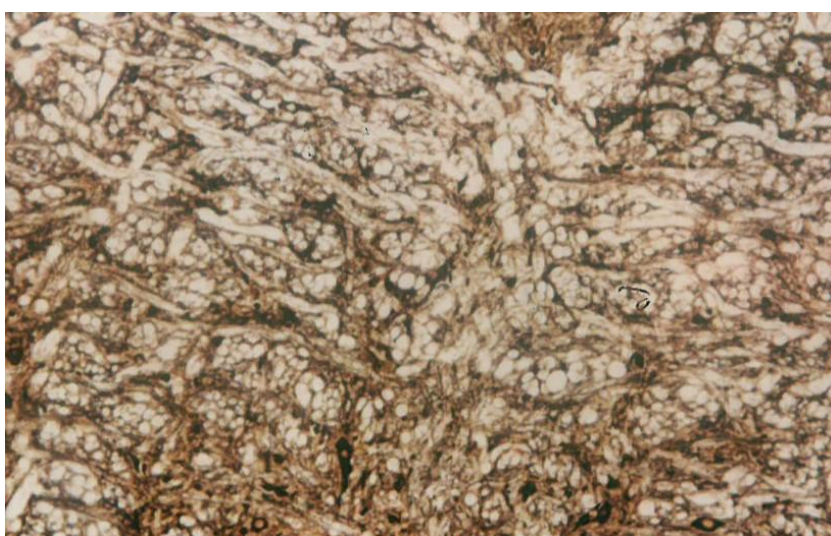


Fig. 2



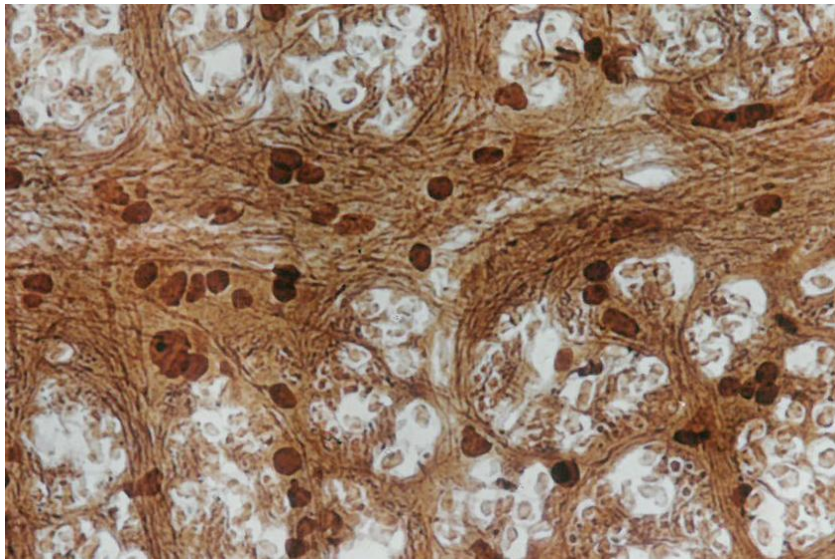


Fig. 3

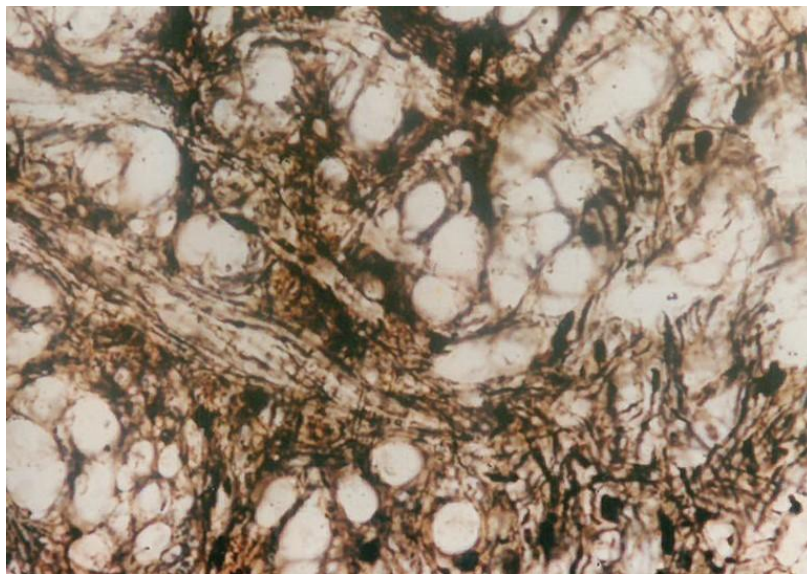


Fig 4

### **Conclusion**

Exposure of rat to gentamicin for three weeks produces some demonstrable microscopic changes in the pons with breaking & disorganization of fibres Swelling as well as loss of continuity of nerve fibres with disappearance of pontine nuclei were also observed.

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