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Testicular Changes of Rats Under Lindane Treatment

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Hexachlorocyclohexane (BHC) is a mixture of a number of isomers in which lindane (Y-isomer) is the most biologically active material (Copeland and Chadwick, 1979; Roy Chowdhury et al, 1983). It is used extensively to control vegetable pests. There are many reports of organochlorine derivatives like Diphenyl Dichloro Trichloroethane (DDT), Dieldrin and Chlordane on the effect of male reproductive system (Starr and Cliford, 1972; Dikshith and Datta, 1972a; Mc Namara and Krop, 1948). Controversial reports on lindane in respect to testicular effect were documented, but were not very conclusive (Nelson and Patanelli, 1965). This paper reports an attempt to detect specific histological changes in the testis of rats after treatment with lindane. The LD_{50} (i.p.) of lindane is 35.85mg/kg (Spector, 1956).

MATERIALS AND METHODS

30 adult male albino rats weighing 120±5g were divided into 3 Groups of 10 each. The 1st Group (A) served as a control while the others were injected intraperitoneally daily with 4mg/kg (Group B) and 8mg/kg (Group C) lindane respectively as a glycerine suspension over a period of 10 days. The control received only glycerine, same volume simultaneously during that period.

On the 11th day cervical dislocation of the rat's neck was conducted. The testes were immediately separated and fixed in 10% formalin.

Paraffin sections of 5 um of the testis were made and stained with hematoxylin eosin.

RESULTS AND DISCUSSION

Previous studies observed that intra-testicular lindane at a dose of 0.2-5mg/testis caused degenerative changes in the seminiferous tubules and they observed large number of multi-nucleated giant cells (Dikshith and Datta, 1972b). In the present study a decrease in the body weight was found in both treated groups but the most severe effect was observed in Group C. Testicular weight was also decreased significantly in the treated groups when compared to controls (Table 1).

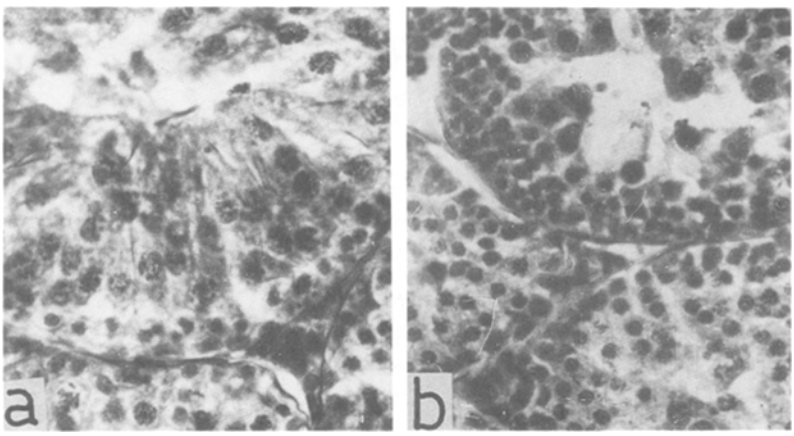

Figure 1 (a): Showing normal testicular tissues of rats with active spermatogenesis (x640); (b) Inhibition of spermatogenesis; seminiferous tubules containing giant cells in the tubular lumen alongwith proliferation of Leydig cells in 4mg/kg lindane (i.p.) treated group (x640).

Table 1. Testicular changes of rats under the treatment of lindane.

Group		Body weight (gm)		Testes weight	
		Initial	Final	Absolute (mg)	Relative (mg/100)
A	Control (i.p.) Glycerine	120.0 ± 4.3	150.0 ± 5.2	963.3 ± 2.8	642.2 ± 3.2
B	4mg/kg (i.p.) Lindane	120.8 ± 2.9	121.1 ± 2.4*	774.5 ± 4.6*	639.6 ± 2.8 NS
C	8mg/kg (i.p.) Lindane	120.8 ± 4.0	88.9 ± 8.4*	391.5 ± 4.9*	440.4 ± 4.2*

NS = Not Significant. * p 0.001

Earlier finding is also in agreement that lindane affects the cellular growth.

Furthermore, seminiferous lumens in the treated group C is completely degenerated and specifically spermatocytes and spermatids are severly affected at the higher doses of lindane. Similar findings, i.e. testicular degeneration was observed in Swiss mice where 500 ppm lindane was mixed in the prepared diet and administered over a period of 40 weeks (Nigam et al, 1979). Observations on the deleterious effects of lindane

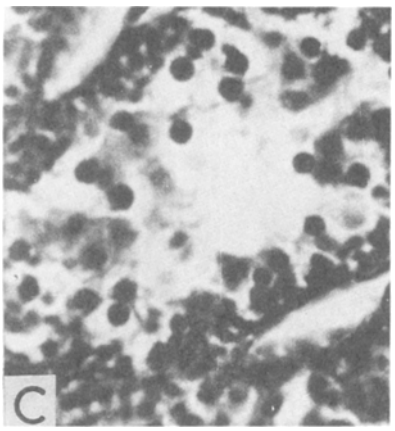

Figure 2: Complete degeneration of the seminiferous tubules and leydig cells after treatment with 8mg/kg (i.p.) lindane (x640).

on the testicular tissue in these experiments kin rats at the dose of 8mg/kg over a period of 10 days (Fig 1) suggest need of in-depth investigations.

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