CHAPTER SIX
SEMINAL VESICLE

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Seminal Vesicle

6.1. Review of literature :

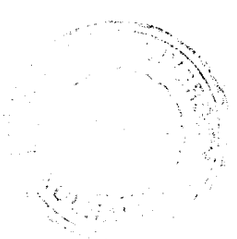
Various chemical compounds, antifertility agents and plant preparations have been tried to explore their effects on seminal vesicles. Following is a brief review of the available literature.

6.1.1. Chemicals :

Estrogenic compound, stilbestrol caused increase in the lysosomal number in seminal vesicular cells of hamster (Belt and Cavazos, 1967). Estrogen administration reduced weight of seminal vesicles (Elkington and Blackshaw, 1971).

Castration in rats significantly reduced height of the epithelial cells of seminal vesicle (Cavazos and Melampy, 1954). S.K. and F. 7690 administration resulted into decrease in the wet weight of seminal vesicle and functional capacity (Saunders et al., 1969) Wong et al., (1972) administered chlorocyclizine and reported formation of cytoplasmic vacuoles in the epithelial cells, which became increasingly more and densely populated accomponied by a reduction in secretion - with time. Norgesterol reduced wet weight of seminal vesicles

(Singh et al., 1972). Administration of alpha - chlorohydrin caused marked regression in seminal vesicles (Vickery et al., 1974; Hundal and Mangat, 1978). Cyproterone acetate treatment reduced hight and width of epithelial cells (Dahl and Tveter, 1974); decreased activity of seminal vesicle with decrease in volume of secretion (Agmo, 1975; Bose et al., 1977). Flickinger (1977) administered medroxy progesterone and found significant reduction in weights of seminal vesicles and in height of epithelial cells. $CdCl_2$ treatment reduced weight, size and secretory activity of epithelial cells of seminal vesicles (Sakensen et al., 1977). Centchroman treated rats showed significant reduction in weights of seminal vesicles (Das et al., 1977 b). Administration of cyclohexanol to rats and gerbils caused reduction in weight of seminal vesicles (Tyagi et al., 1979). Kaur and Mangat (1979) reported reduction in weights and inhibition of secretory activity after the administration of chloromadinone acetate. Atrophy of seminal vesicles was reported, with aspirin treatment, by Balasubramanian et al., 1980). Dhar and Setty (1987) administered flutamide and found marginal reduction in weight of seminal vesicles. Cyproterone acetate administration to albino rats caused decrease in the weight of seminal vesicles (Bhiwgade et al., 1990).



6.1.2. Plant preparations :

Kasinathan et al. (1972) administered Oscimum sanctum extract to mice and found change in the pH of seminal plasma. Aristolochia indica administration to mice caused a significant reduction in the size and weights of seminal vesicles (Pakrashi and Pakrashi, 1977). Malvaviscus conzanttii extract when administered to rats and gerbils caused decrease in weights of seminal vesicles (Dixit, 1977 b). Calotropis procera treatment reduced weight of seminal vesicles of gerbils (Garg, 1979). Verma et al., (1980) administered Malvaviscus conzanttii extract to mice and reported decrease in relative weights of size of seminal vesicles. In hibition in the arborization of secretory epithelium, reduction in cell height and in secretion were also evident. Dry powder of Allium sativum when fed to rats caused reduction in weight of seminal vesicles (Dixit and Joshi, 1982). Toro (1984) with Vinca rosea alkaloids treatment reported decrease in cellular height. Butea monosperma leaves extract showed no significant change in the height of epithelium but reduction in wet weights (Awati, 1985). Sohani (1985) reported decrease in wet weight of seminal vesicle after the administration of Vitex negundo extract to albino rats. Administration of Daucus carota seed extract reduced

cell height and weights of seminal vesicle (Shah, 1985). Khanna et al., (1986) reported feeding of Oscimum sanctum to albino rats caused significant decrease in weights of seminal vesicles. Jadhav (1988) administered plumbagin to albino rats and found reduction in height and arborization of mucosal folds of seminal vesicles. Vinca rosea extract affect general histoarchitecture of seminal vesicles in albino rats (Chinoy et al., 1988 a; 1988 b). Hiremath (1988) reported decrease in weight of seminal vesicle after administration of Piper betle petiole extract to rats. Oleanolic acid (from Eugenia jambolana) when administered to rats caused no significant change in weight of seminal vesicles (Rajsekaran et al., 1988). Andrographis paniculata when administered to rats caused decrease in weights and many degenerative histological alterations in it (Akbarsha et al., 1990). Syzygium cumini seed extract administration caused decrease in weight of seminal vesicles with certain structural changes (Ambaldage, 1990). Picrorhiza kurroa extract when administered to albino rats resulted into reduction in weight of seminal vesicle and its secretory activity (Patre, 1990).

6.2. OBSERVATIONS :

6.2.1. Alterations in wet weights of the seminal vesicle :

The variations occurring in the wet weight of seminal vesicle of control and experimental rats are recorded in Table No. 7 and illustrated in Graph No. 7.

Table No. 7 : Seminal vesicle : Agnus castus extract induced alterations in wet weights.

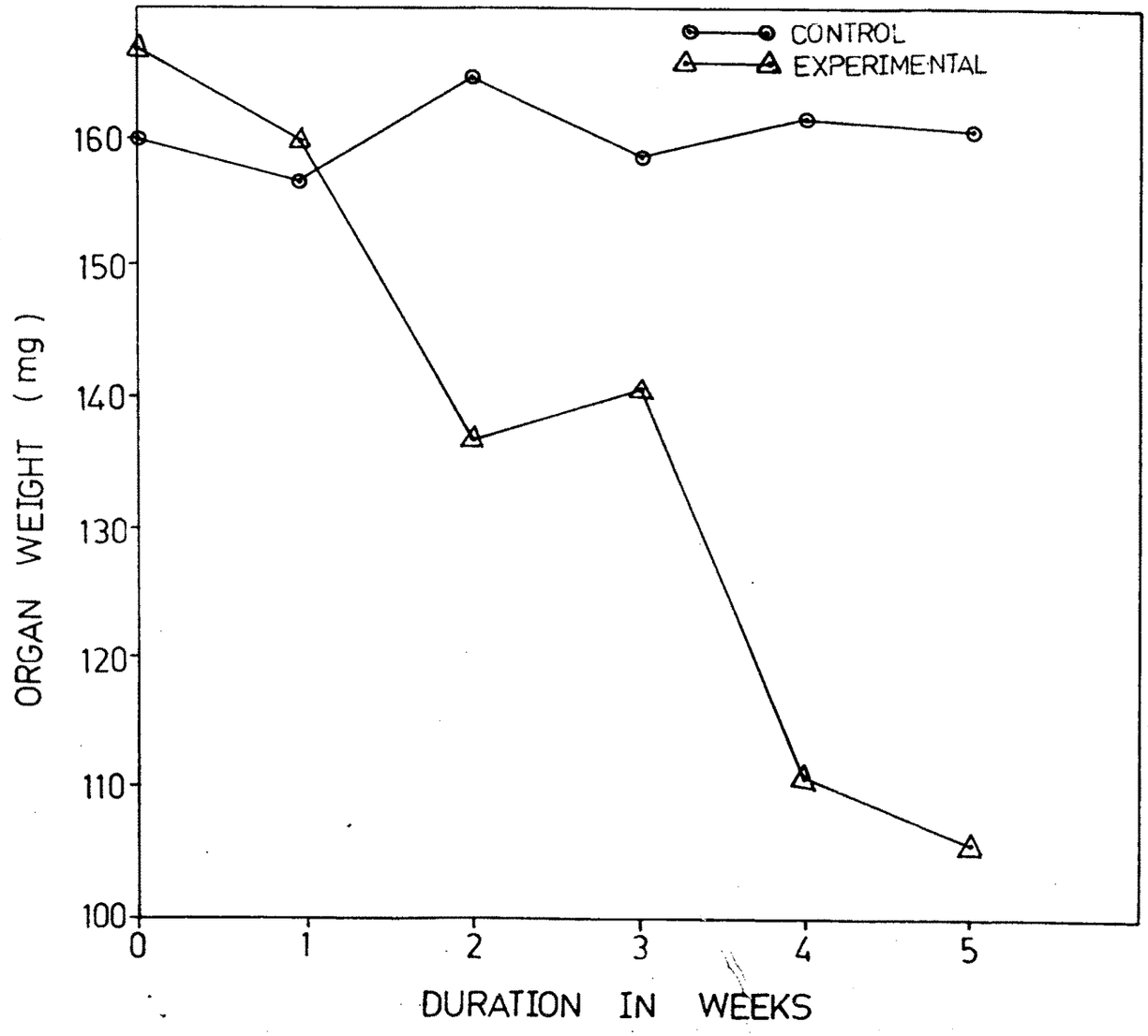
Duration in weeks	Control wt. of seminal vesicle(mg)	Experimental wt. of seminal vesicle(mg)
0	160 ± 5.8	167 ± 6.0
1	157 ± 5.2	160 ± 5.5
2	165 ± 5.8	137 ± 4.3
3	159 ± 4.7	141 ± 4.6
4	162 ± 5.5	112 ± 3.8
5	156 ± 4.8	107 ± 3.6

(Values are mean ± S.D. of three animals and are expressed in mg/100 g. of body weight).

As seen from the tabular and graphical illustrations, the wet weights of seminal vesicle remained fairly constant in control rats which received only vehicle. But in the rats receiving Agnus castus extract, the wet weights of seminal

SEMINAL VESICLE

ALTERATIONS IN WET WEIGHT (mg)



Graph No. 7

vesicle decreased as a function of duration of treatment.

Initially the wet weight of seminal vesicle of control rat was 160 ± 5.8 mg/100 g. of body weight. It showed minor variations to 157 ± 5.2 mg, 165 ± 5.8 mg, 159 ± 4.7 mg, 162 ± 5.5 mg and 156 ± 4.8 mg/100 g. of body weight after 1^{st}, 2^{nd}, 3^{rd}, 4^{th} and 5^{th} week respectively.

The wet weight of seminal vesicle of the experimental rat was 167 ± 6.0 mg/100 g. of body weight initially. It then depleted to 160 ± 5.5 mg and 137 ± 4.3 mg after 1^{st} and 2^{nd} week of treatment, respectively. It rose to 141 ± 4.6 mg after 3^{rd} week of the treatment. It again decreased to 112 ± 3.8 mg and 107 ± 3.6 mg/100 g. of body weight after 4^{th} and 5^{th} week of the treatment respectively.

6.2.2. Alterations in Histology :

The histological structure of seminal vesicles of control rat consisted of mucosa, lamina propria, muscular coat and luminal secretion. (Plate No. 4, Fig. 3). It did not differ from that of the normal.

i) Mucosa :

It is formed of two types of cells, large columnar secretory cells and small basal cells. The mucosa was thrown

into folds in a complicated manner called arborization, forming numerous irregular chambers or grypts. These projected into the lumen. Nuclei of columnar cells were elongated in shape and placed basally, while nuclei of basal cells were spherical and located basally. Cellular cytoplasm contained secretory granules.

ii) Lamina propria :

It was composed of elastic fibres and formed a continuous layer around the vesicle and also pierced into folds.

iii) Muscular coat :

Outside the lamina propria muscular coat of smooth muscles was found. It was divided into inner circular and outer longitudinal layers.

iv) Luminal secretion :

Interior of the seminal vesicles was divided into many lumina by septa, which were full of secretion. The secretion was retained in the depths of crypts and in patches adherent to the surface of the cells adjoining the main part of the lumen.

Experimental :

As stated previously the entire period of the Agnus castus extract treatment is divided into two phases.

I) First phase of treatment :

i) Mucosa :

Height of the epithelial cells remained unaltered. The mucosal folds which were extending upto the centre of lumen got shortened.

ii) Lamina propria :

Except for slight thickening it did not show any significant change.

iii) Muscular coat :

It exhibited no change.

iv) Luminal secretion :

Lumina of vesicle contained secretory material but it was fairly reduced.

II) Second phase of treatment :

i) Mucosa :

Epithelium showed signs of degeneration. It showed intense eosinophilia. Mucosal folds reduced considerably, decreasing arborization pattern exhibited by the epithelium.

ii) Lamina propria :

It showed degeneration and seen to be separated from muscular coat.

iii) Muscular coat :

Muscular layer showed loose arrangement in outer area, while the inner circular layer seen to be detached from the outer.

iv) Luminal secretion :

Because of the reduction in the arborization of mucosa, the lumina appeared widened. The lumina showed decrease in secretion while some lumina were without any secretion (Plate No. 4, Fig. 4).

6.3. DISCUSSION :

In the present part of the chapter the alterations seen in wet weights and histological structures of seminal vesicles, after administration of Agnus castus extract are proposed to be discussed at a comparative level with the available literature.

In the present investigation it is observed that the wet weight of seminal vesicles decreases after the administration of Agnus castus extract. Similar observations are seen after administration of estrogens (Elkington and Blackshaw, 1971), horgesterol (Singh et al., 1972), alpha - chlorohydrin (Vickery et al., 1974; Hundal and Mangat, 1978), centchroman (Das, 1977 b), medroxyprogesterone (Flickinger, 1977), Cyproterone acetate (Bose et al., 1977), Clomiphene citrate (Kaur and Mangat, 1979), endosulfon (Ansari and Gupta, 1981), formaldehyde (Shah et al., 1987), Flutamide (Dhar and Shetty, 1987), acetyl mercury chloride (Rao, 1988), STS - 557, Flutamide and cyproterone acetate (Gupta et al., 1989), Lithium chloride (Ghosh et al., 1990 a, 1990 b).

Many plant preparations also reported to decrease wet weight of seminal vesicles. These are Aristolochia indica (Pakrashi and Pakrashi, 1977), Malvaviscus conzanttii (Dixit,

1977 b), Calotropis procera (Garg, 1979), Allium sativum (Dixit and Joshi, 1982), Daucus carota (Shah, 1985), Vitex negundo (Sohani, 1985), Butea monosperma (Awati, 1985), Oscium sanctum (Khanna et al., 1986), Gossypol and Tripterygium wilfordii (Xu et al., 1987), Plumbagin (Jadhav, 1988), Piper betle (Hiremath, 1988, Adhikary et al., 1989), Picrorhiza kurroa (Patne, 1990), Andrographis paniculata (Akbarsha et al., 1990). The decrease in wet weight of seminal vesicles after administration of Agnus extract seems to be due to the less secretion.

The mucosal folds which were highly arborized and reach upto centre of the lumen of seminal vesicle get reduced in hight and arborization. Such reduction resembles that reported with chlorocyclizine (Wong et al., 1972), aspirin (Balsubramanian et al., 1980), methyl mercury chloride (Vaccharajani et al., 1980). Some plants are also reported to induce similar results. These plants are Malvaviscus conzanttii (Verma et al., 1980), Vinca rosea (Toro, 1984), Daucus carota (Shah, 1985), Butea monosperma (Awati, 1985), Vitex negundo (Sohani, 1985), Plumbagin (Jadhav, 1988), Piper betle (Hiremath, 1988) Syzygium cumini (Ambaldage, 1990), Picrorhiza kurroa (Patne, 1990) and Andrographis paniculata (Akbarsha et al., 1990).

Agnus extract administration caused into decrease in the secretion as a result majority of lumina are without any

secretion. Similar results are obtained after administration of Chlorocyclizine (Wong et al., 1972), cyproterone acetate (Agmo, 1975), $CdCl_2$ (Sakensen, 1977), alpha - chlorohydrin (Hundal and Mangat, 1978), Chloromadinone acetate (Kaur and Mangat, 1979). Similar observations are reported with plant Aristolochia indica (Pakrashi and Pakrashi, 1977), Malvaviscus conzanttii (Verma et al., 1980), Vinca rosea (Toro, 1984), Daucus carota (Shah, 1985), Butea monosperma (Awati, 1985), Vitex negundo (Sohani, 1985), Piper betle (Hiremath, 1988), Plumbagin (Jadhav, 1988), Syzygium cumini (Ambaldage, 1990), Andrographis paniculata (Akbarsha et al., 1990) and Picrorhiza kurroa (Patne, 1990).

Agnus castus extract thus alters the seminal vesicular structure and function. In the present investigation wet weight of the organ decreased. Wet weight of accessory reproductive organs is a good indicator of circulating androgen (Moore et al., 1930), which is necessary for its normal functioning (Bedwal and Mathur, 1980). It seems that some antiandrogenic substance in Agnus decreases testosterone level and causes reduction in weight and some regressive changes in seminal vesicles.