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REPRODUCTIVE TOXICITY AND ITS MANAGEMENT ACCORDING TO AYURVEDA: A REVIEW

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ABSTRACT

Reproductive toxicity is the effect of chemicals on the reproductive system and on neuroendocrine system. As the days are passing lots of chemicals are interacted with the population. Such toxins have hazardous effect over human health. So one of the effect is on the reproductive system. Such toxins interfere in some way with normal reproduction. We call such chemicals as Reprotoxic. They have adverse effects over sexual function and fertility in adult males and females. It not only cause effects on reproductive system but also has effect on developmental toxicity in the offspring. In this new era infertility is the most common problem. Some studies also told this environmental toxins as endocrine disruptors that feminize the male animals and androgenize the female animals. Until now we assume and find the infertility causes in women and not in the men. Exposures to such chemicals have hazardous effects over Male and Female Reproductive system.[1] Toxicants that target the Male Reproductive System not only affect the sperm count but also change in shape of sperm, alter sexual behavior and also increase infertility. Many organic chlorine compounds like DDT, PCB have significant effect on fertility. Even many medicines just like Thalidomide, Diethyl stilbesterol have effects over the embryo development. According to ayurveda such toxins gets accumulated inside the body and gets converted into *Dushivisha.* While explaining about *Dushivisha, Acharya Sushruta* has mentioned destruction of sperm. While explaining about the *Upadravas* of *Dushivisha Acharya Sushruta* have mentioned decrease in sperm quantity.[2]

KEYWORDS: Reproductive Toxicity, Infertility, Toxins, Reproductive system, Pesticides

Aim: To study reproductive toxicity and its management according to ayurveda.

OBJECTIVES

1. To study Reproductive toxicity.
2. To study the reprotoxic chemicals.
3. To study the effect of chemicals on male and female reproductive system.
4. To study the ayurvedic management of Reproductive Toxicity.
5. To study the preventive aspects of reproductive Toxicity.

INTRODUCTION

Today's one of the most common problem is infertility. This is mainly due to changing life style and also interference of environmental toxins on human's health. Such toxins like Lead, Pesticides etc and many medicines have many hazardous effects. But one of the most hazardous effects is on Reproductive system. According to ayurveda the reproductive tissues are the last tissue layers to receive nutrients. Reproductive health is related with the generation of new cells within the body. When Reproductive system is strong, the whole body is strong and capable of regeneration. So it is necessary to keep the reproductive tissues healthy and vital. The Female Reproductive System consist of Ovary, Fallopian tube, Uterus, Cervix, Vagina.[3] The function of the external female reproductive structures is to enable sperm to enter the body and to protect the internal genital organs from infectious organisms. Occupational or environmental exposure to chemical or biological agents may be harmful to the reproductive health of the people. These toxins damage the genetic material of the cells of male and female workers and have adverse effects on their sexual function and fertility. Reproductive Toxicity is defined by the Globally Harmonized System as adverse effects on sexual function and fertility in adult males and females as well as developmental offspring. Developmental Toxicity means adverse effects induced during pregnancy or as a parental exposure manifested at any point in the life span of organism. This agents may be harmful to pregnancy and foetus.[4] We can correlate this toxins with *Dushivisha*. While describing about *Dushivisha Acharya Sushruta* have already mentioned *shukranash* and *shukrakshay*. So we can give here *Swedan, Vaman, Virechan* used in the treatment of *Dushivisha*. By this we can remove toxins outside the body. After that we can use the kalpa like *Dooshivishaari Agada* as the contents in it have *Vishaghna* and anti infertility properties.

METHODOLOGY

- Conceptual study

- Comparative study
- Result and Discussion
- Conclusion

Reproductive toxicity

Reproductive toxicity is the effect of chemicals on the reproductive system and on neuro-endocrine system. There are two modes of Disruption like morphology disruption and endocrine disruption. Morphology disruption includes Reproductive tract malformation, Hermaphrodite. Endocrine disruptors include feminization.

Toxicants[5]

Toxic Agent		**Industry or Occupational Group**	**Reported effects of female exposure**	**Reported effects of male exposure**
Bisphenol-A	Endocrine disruptors	Used in the production of plastics	Mammary gland morphogenesis, increased formation of ovarian tumors .Increased risk of mammary gland neoplasia	
Pthalates		Plastic food container, cling wrap IV bags	Miscarriage, testicular toxicity	
Lead	Endocrine disruptors	Battery industries , Lead smelting, pottery industry	Causes disruption of hormones, decrease in sperm quantity	Reduced semen quality, Reduced fertility, Foetal loss, Birth defects
Organic Mercury			Cerebral palsy , Brain malformation	
Copper			Motility of sperm is affected	
Organochloride Insecticides	Agriculture, Gardening		Reduced fertility, Fetal loss, Birth defects	Reduced sperm quality, Reduced fertility, Fetal loss, Birth defects

Pathological Changes

The toxicants form morphological lesion or any functional deficit. In males they target specially testis, epididymis, mature sperm and hormone regulatory system. The significance of the Reproductive tract lesions can be studied by the knowledge of physiology of testis and epididymis and in particular understanding of duration of sperm production and transport .In female reproductive toxicity pathologist found Hyperprolactinaemia. The protein have

inhibitory effects over ovarian follicle maturation and ovulation. Some of the pathological changes in male and female are given below.

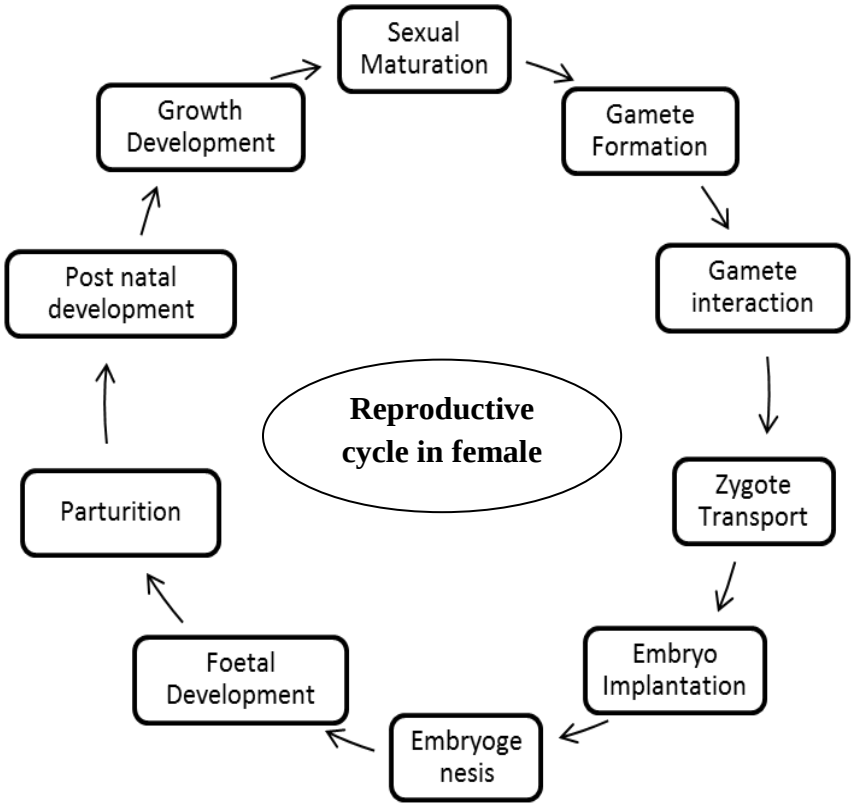
Pathological changes in Male Reproductive System[6]

TARGET CELLS	TOXICANTS	EFFECTS
Leydig cells	Ethanedimethane sulphonate	Leydig cell necrosis with secondary germ cell death
Sertoli cells	Pthalate esters	Sertoli cells vacuoles, germ cell death
Spermatocytes	2methoxyethanol,dinitropyrroles	Spermatocyte death with depletion of post-spermatocyte germ cells
Testicular blood vessels	Cadmium chloride	Endothelial necrosis with secondary ischaemic necrosis of all cell types
Vas deferens	Guanethidine	Ejaculation inhibition due to the blockage of adrenergic ganglion
Prostate and seminal vessels	Flutamide	Blockage of Androgen receptor results secretory inhibition and atrophy

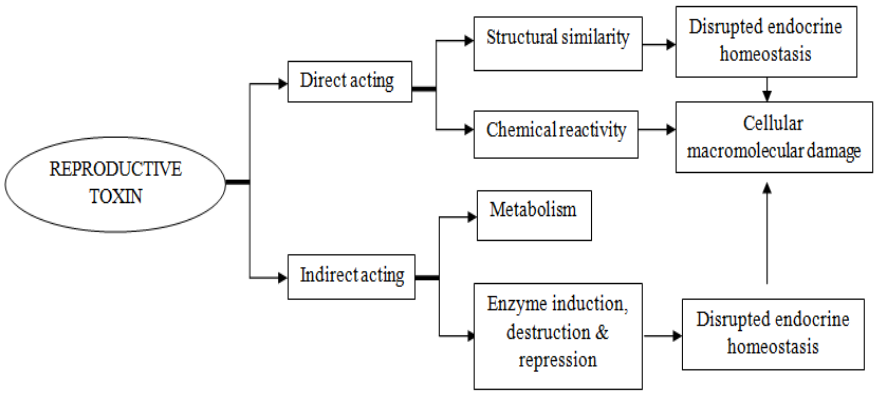
Pathological changes in female reproductive system[4][7]

Toxins	Effects
1.Diethylstilbesterol	Anatomic abnormalities of the reproductive tract, decreased sperm density, count and motility, Neoplasms of reproductive tract
2.Polycyclic Aromatic Hydrocarbons	Ovarian toxicity and oocyte destruction
3.Galactose	Ovarian failure with galactosemia due to deficiency in uridyltransferase and apparently normal ovarian function in women with galactosemia due to kinase deficiency suggest that toxicity is due to galactose 1 phosphate
4.Halogenated Polycyclic Hydrocarbons	Disruption of Reproductive system by two mechanisms: Induction of hepatic mono-oxygenase and structural similarity to oestrogens by acting directly
5.Nicotine	Release of Epinephrine increases utero tubal motility and release of oxytocin which alters uterine motility

Reproductive Cycle in Female[4]



Mechanism of Reproductive Toxicity



Occupational or Environmental exposure to toxins cause

1. Alterations in sex hormone
2. Libido decreased
3. Menstrual Disorders.[8]
4. Haematological effects.[8]
5. Spontaneous Abortion.[9][10]
4. Birth Defects.[5]

5. Reduced birth weight.[11][12]

6. Reduced fertility.[13][14][15]

Preventive measures

1. Top six environmental toxins to avoid

Pesticides	These are found on non organic fruits and vegetables, meat, dairy and unfiltered tap water.
Formaldehyde	This is found in air freshener, deodorants, Floor polish
Bisphenols	They are found in plastic containers
Organic solvents	Petroleum based liquids found in household products, electronics, car repair, photography agriculture, printing, construction and cosmetics
Unfiltered tap water	Our waterways are polluted continuosly by industrial waste and by products, pharmaceutical drugs, pesticides, Herbicides
Heavy metals	Most common reprotoxins

2. Avoid consumption of Junk Food

3. Proper care should be taken by the labours in industries that cause reproductive toxicity.

4. Daily exercises

Ayurvedic management[2,16]

Ayurveda treats the whole body not only the individual illness. The following management can be done in the reproductive toxicity.

Swedan

In *Swedan* the impurities gets perspired and get rid out of the body. It is used to remove toxins out of the body.

Vaman* and *Virechan

It expels the toxins out of the body. As Acharya Sushruta have mentioned in the treatment of *Dushivisha* after *Swedan* we can use *Vaman* and *Virechan* here.

Internally

Dushivishaari Agad[17] can be given internally to detoxify the body and to neutralise the effect of reprotoxic chemicals. This will help for the proper development of foetus which were exposed to reprotoxic chemicals.

Sanskrit Name	Latin Name
Pippali	Piper longum
Dhyamaka	Cymbopogon martini
Jatamansi	Nordostachys jatamansi
Lodhra	Symplococcus racemosa
Ela	Elettaria cardamomum
Suvarchika	Salt petre
Kutanattam	Oroxylum idicum
Natam	Valeriana wallichi
Kushtha	Saussurea lappa
Yashtimadhu	Glycyrrhiza glabra
Chandan	Santalum album
Gairik	Red ochre

DISCUSSION

In the above study we studied that there are various environmental toxins with which we interact in our day to day life. Such toxins have hazardous effects over human reproductive reproductive health. Such toxins have major effect over fertility and cause infertility. The infertility is one of the commonest problem. We can correlate this toxins with *Dushivisha*. In *Dushivisha* while explaining its complications *Acharya Sushruta* have mentioned destruction or decrease in sperm quantity. And so in the treatment of this Reproductive toxicity we can give *Swedan, Vaman, Virechan* and *Dushivishaari agad* orally in the treatment of Reproductive Toxicity.

CONCLUSION

The most common effect of reproductive toxicants is infertility. History is most important. While treating infertility we have to find reasons in both male and female. The management can be done as mentioned above. Before starting any treatment for infertility the above protocol should be followed for the better results.

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