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IMPACT OF EPILEPSY IN REPRODUCTIVE HEALTH OF ADOLSCENT GIRLS: AN *AYURVEDIC* AND MODERN PERSPECTIVE

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ABSTRACT

Introduction: Adolescence is a transitional phase of growth and development between childhood and adulthood. This is a vital stage for both boys and girls. Epilepsy is a common neurological disorder frequently countered during childhood and adolescence. In girls with epilepsy, this adolescence period may be complicated by changes in seizure, severity, frequency around puberty and menarche, menstrual abnormalities, reproductive endocrine disturbance and adverse effects associated with antiepileptic medication. **Aim & Objective**: To review the available classical Ayurvedic literature and Modern evidence regarding the impact of Epilepsy (*Apasmara*) and Anti- epileptic medications on puberty, menstruation, reproductive hormones and fertility and pregnancy. **Materials and Methods:** Relevant literature was reviewed from Ayurvedic text, Modern medicine text, internet, journals and other scientific sources. **Result**: There is impact of epilepsy and anti-epileptic drug therapy on adolescent girls reproductive health. Adolescent girls with epilepsy may have irregular menstruation, anovulatery cycles, PCOS, infertility and variety of complications in future pregnancy. **Conclusion**: Epilepsy in adolescent girls should be considered neuro-endocrine context. It requires special attention towards her reproductive functions. *Ayurveda* describe *Artava* in relation to female reproductive physiology while reproductive dysfunction considered through concepts such as *ArtavaDushti* and *ArtavaKshya* also describe *ArtavahaSrotas*.

KEYWORDS: Epilepsy, Adolescent girls, *Apasmara*, Reproductive Health, *Artava*, Anti-epileptic drugs.

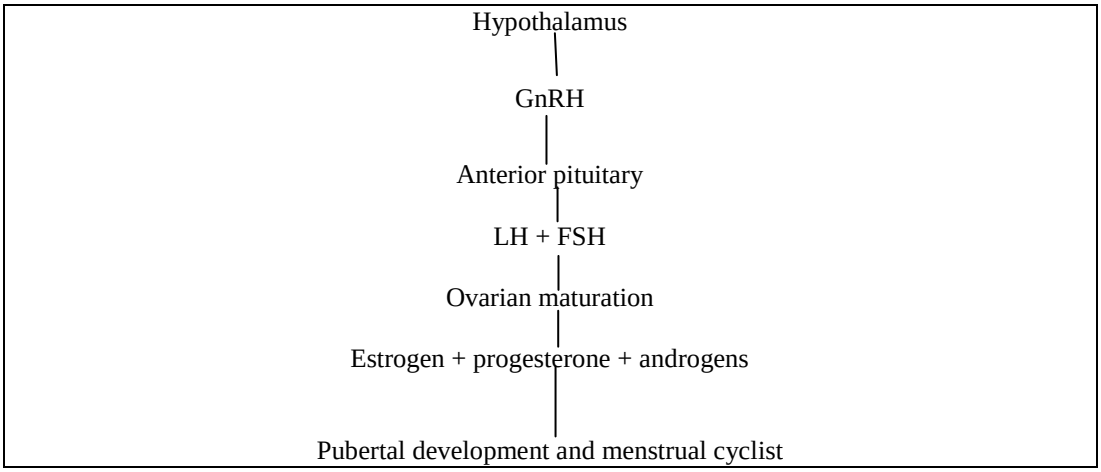
INTRODUCTION

Adolescence represents a dynamic transition between childhood and adulthood which is characterized by profound biological, psychological and social changes. This period also characterized by rapid somatic growth, neuroendocrine maturation and reproductive maturation. In girls this period is particularly important because activation and maturation of the hypothalamic- pituitary – gonadal axis leads to pubertal development menarche and progressive establishment of reproductive functions.[1] Therefore, any chronic neurological disorder like seizure disorder which commonly occurring during this period and it's clinical management may potentially influence normal pubertal and reproductive development. The epileptic disorder and female reproductive system physiology is complex and bidirectional pathophysiology of seizure disorder influence by changes in endogenous reproductive hormones. While epileptic attacks and anti-epileptic medication may influence neuroendocrine and reproductive functions. Current evidence stated that adolescent girls with epilepsy have higher rates of menstrual disturbance and reproductive endocrine abnormalities.[2] According to Ayurveda classical text adolescence represents an important phase of physiological development while normal female reproductive functions depends upon proper formation

and functioning of *Artava*. Adolescence is a time for growth spurts and puberty changes and according to *Ayurveda* these changes develop during this period is known as *Rajodarshana* or menarche, which is the product of Rasa flows out of the body in every month, after the age of twelve years and slowly reduce by the age of 50 years.[3] the chronic disorders affecting *Dosha*, *Agni*, *Dhatu* and *Artavavahasrotas* may manifest as abnormalities of menstruation and reproductive capacity. *Ayurvedic* literature has discussed *Artavakshaya* and *ArtavaDushti* in relation to irregular menstruation and reproductive health.[4] Seizure activity may changes around puberty and menarche, while menstrual abnormalities such as anovulatory cycles, irregular bleeding and amenorrhea occur more frequently in girls with epilepsy.[5] Certain anti epileptic medications may further influence reproductive physiology. Valproate, in particular, has been associated with endocrine abnormalities and polycystic ovarian syndrome in some adolescent girls and women with epilepsy.[6]

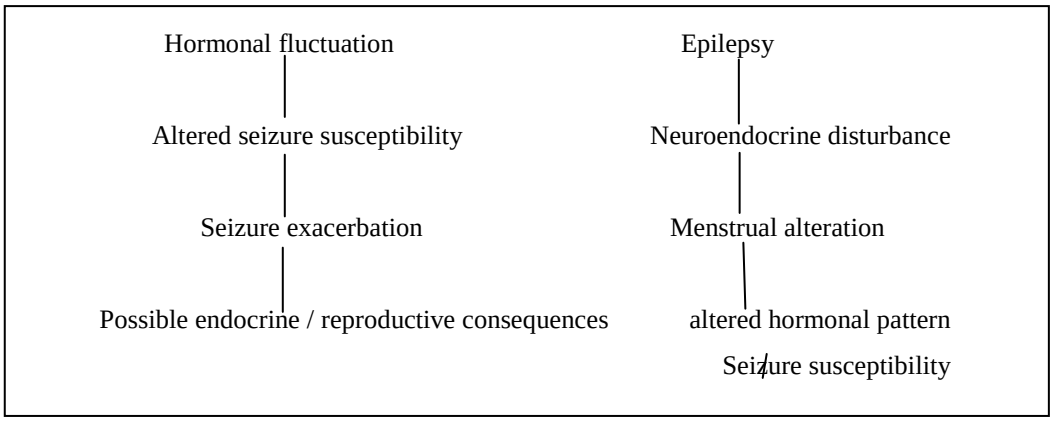
Epilepsy and Adolescence: Epilepsy during adolescence may influence several domain of development like neurological maturation academic performance, emotional well-being, social functioning, puberty menstrual health, reproductive endocrine function, future pregnancy. It may be a direct effect of epileptiform discharges on pituitary and hypothalamus. Seizure can lead to an increase in the serum prolactin level and an acute increase in luteinizing hormones (LH) and stimulating hormone (FSH).[7]

Puberty and Epilepsy: Puberty involves progressive activation of the hypothalamic- pituitary- gonadal axis. The basic physiological pathway can be represent as.



Epilepsy in Adolescene girl may interact with this system at several levels.[8] Anti- epileptic drug and adolescence girl with epilepsy Anti- epileptic drug used during the management of girl with epilepsy may also produce reproductive and endocrinal disturbance. They may interfere with hypothalamic pituitary axis and produce amenorrhoea, oligomenorrhea and prolonged and irregular cycles. Higher incidence of PCOD is also reported in women taking valproate sodium. Epileptic adolescence girl who were taking phenobarbital had a significantly higher risk of infertility but no such trend was observed with other AED drugs.[9]

Menstrual function in adolescence girls with Epilepsy Menstruation represents important abnormalities in girls with epilepsy i.e. irregular cycles, oligomenorrhea, amenorrhea, abnormal uterine bleeding, anovulatory cycles, altered premenstrual symptoms. Menstrual irregularity can also result from normal adolescent maturation, nutritional factors, stress, endocrine disorders, PCOS or medication effects.



The relation is therefore potentially bidirectional.[1]

Epilepsy and Infertility

The concern about future fertility is highly relevant to adolescent girl and their families. Fertility outcomes in women with epilepsy are influenced by several factors, including seizure type, reproductive endocrine function, anti-epileptic medication, comorbid PCOS, sexual health, psychological factors and pregnancy related considerations. Reduction in libido is reported in 1/3rd of epileptic women or epileptic men.[11] In epileptic females hyposexuality and orgasmic dysfunction is reported which is more common in focal seizures as compared to generalized seizure activity. Lower birth rates in women with epilepsy may also be due to social inhibition, poor self-esteem, fear of seizure during relationship and intercourse, fear of the effects of epilepsy and it's treatment on pregnancy, late marriage, fear of development of seizure in subsequent children and sexual dysfunction due to social & cognitive factors.[12]

Apasmara comes under the group of *shareeramanoadhisthitha Manasavikara*. It is compared to epilepsy. *Dosha* - Both *sharirika* and *manasikadoshas* are involved in *samprapti* of *Apasmara*. *Sharirikadosha* like *vata* (*Udana, Pranavayu, Vyanavayu*.) *Pitta* (*Sadhaka pitta, alochaka pitta.) Kapha (Tarpakakapha*) responsible for *Apasmara vega*. The *Ahara*, *vihara* which vitiate the respective *saririkadoshas* are also responsible for the vitiation of the *Manasikadosha* viz. *Rajas* and *Tamas*.[13]

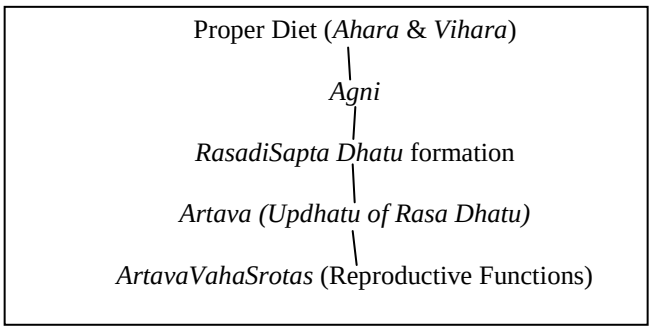
Dushya – Rasa, Majja

Srotas – RasavahaSrotas, SanjnavahaStrotas (Manovaha)

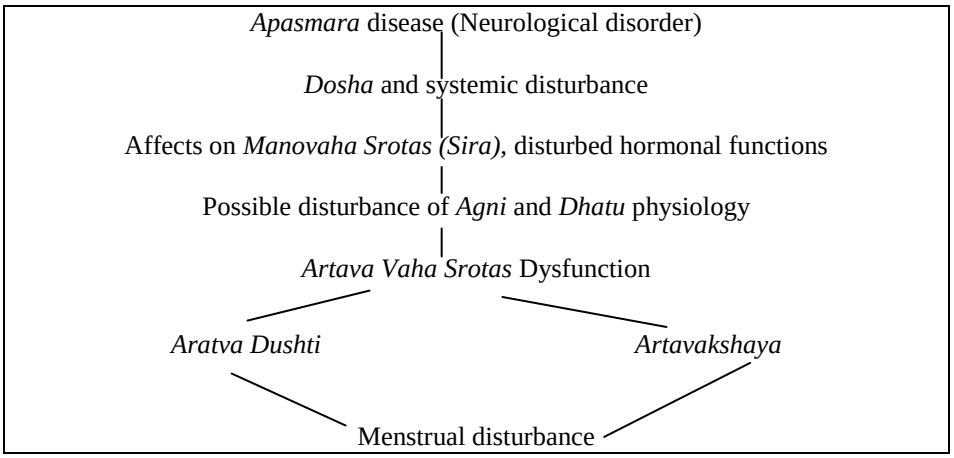
Ayurveda describes *Artava* in relation to female reproductive physiology while disorders of menstruation can be considered through concepts such as *ArtavaDushti* and *ArtavaKshaya*.

Artava

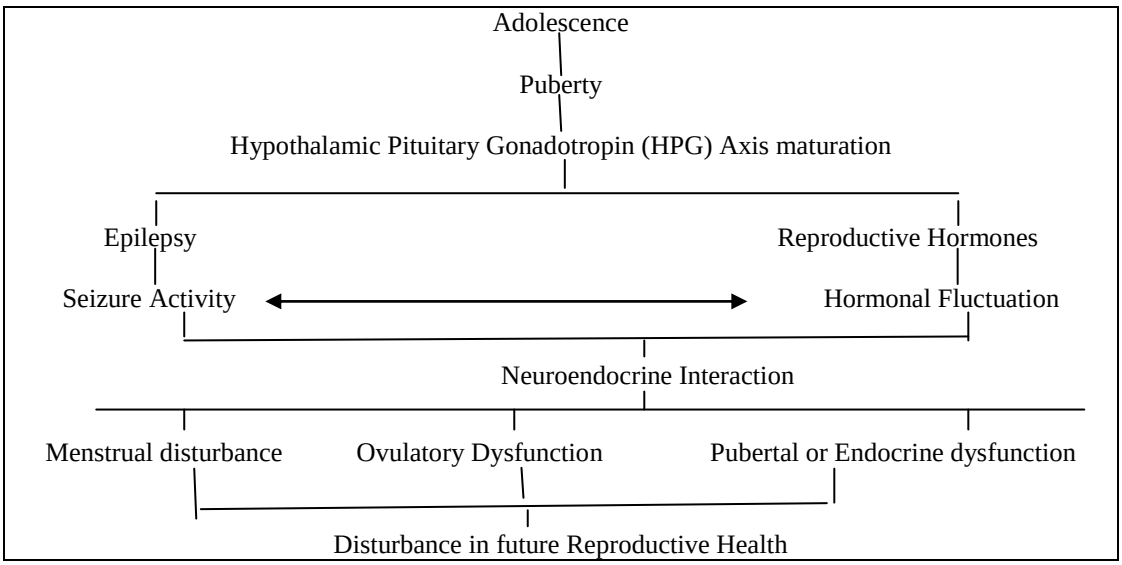
In Ayurveda word '*Artava'* denotes menstrual blood. *Artava* is related to 2 reasons i.e. it may be due to presence of *Ritukala*(ovulation) period and *Rajakal* (menstrual period) in woman. Human body is controlled by the three energies called *TridoshasVata*, *Pitta* and *Kapha* which are characterized under seven *dhatu*. These *Dhatus* have *Updhatus* also. *Artava*(menstrual blood) is one of the *Updhatus* of *Rasa Dhatu*.[14] The specific characteristics of menstrual blood with it's physiological and pathological variation described in Ayurveda classics as *shudhartava* and *ArtavaDushti* respectively help in identifying the hormonal status of women. The hormones of hypothalamus to pituitary then to ovary and ultimately to their target organ i.e. *endometrian* is carried through *Rasa*, the plasma in this endometrium the blood is accumulator and then discharged during menstruation. *ArthavaDushti* is caused by certain variables that contribute to *dosha* vitiation in conjunction with predisposing factors.



ArtavaVaha Srotas



In *Apasmara*, *Rasavaha Srotas dushti* occurs, it affects *Sanjavaha srotas* and disturbed hormones secreted by endocrine glands.



DISCUSSION

Epilepsy and seizures affect the level of pituitary and hypothalamic hormones and some anti-epileptic drugs changes the amount of sex steroids generated by the adrenal glands and ovaries. Puberty introduces substantial changes in sex steroid concentrations, while epilepsy itself may influence neuroendocrine regulation. The resulting interaction may contribute to menstrual and reproductive endocrine abnormalities in some girls. The effect of anti-epileptic medications adds another layer's of complexity. Sodium Valproate has been associated with hyperandrogenism and reproductive endocrine abnormalities in several studies, including studies specifically involving girls during pubertal maturation. According to *Ayurveda*, *Artava*, *Artavavahastrotas* described in text related to female reproductive system. *Artava* is *Upadhatu* of '*Rasa'*. In *Apasmara* disease, *Rasavahasrotasdushti* found. So, *Apasmara* and *Artava* formulation bidirectional. *Apasmara* is *Sajnavahasrotasvikara* also. Due to '*Rasa'* dhatu affected. *Artava* formation also disturbed and it affect female reproduction system of some girls.

Doshadushti → *Agnimandya* → *Dhatu Poshana* disturbed → *Artavasrotodushti* → *Artava* formulation disturbed → *Apana Vayu Dushti* → Reproductive system dysfunction.

CONCLUSION

Epilepsy in adolescent girls represents an important intersection of neurological, endocrine and reproductive health. Puberty and menarche are periods of substantial hormonal change during which seizure patterns may alter and menstrual abnormalities may become clinically evident. Females with epilepsy have increased rates of menstrual and reproductive endocrinedisturbances while anti-epileptic medications particularly valproate may contribute to endocrine abnormalities in adolescents girls. Epilepsy does not necessarily result in infertility. Future reproductive health is influenced by multiple interacting factors and early identification of menstrual, endocrine and metabolic abnormalities provides an

opportunity for appropriate intervention and counselling, following *Dinacharya*, appropriate *Ahara*, adequate sleep, stress management, *Sadvritta*, Yoga, appropriate pranayama, Meditative practices, Panchakarma intervention in an adolescent girl with epilepsy can altered dysfunction of female reproductive system.

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