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A PARADIGM ON ENDOCRINE DISORDERS W.S.R TO PITUITARY GLAND DISORDERS UNDER THE LIGHT OF AYURVEDA

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ABSTRACT

The pituitary gland may raise or lower one or more hormones. A hormone imbalance can cause physical or mood changes. At the same time, pituitary disorders often develop slowly. It may take a long time until you notice symptoms. Symptoms of pituitary disorders are similar to those of other diseases. Many people are misdiagnosed or go undiagnosed. The diagnosis of pituitary disease is generally uncomplicated. This is despite the high prevalence of occult pituitary adenomas in the general population, the widespread use of high definition imaging techniques, and the broad range of intra and perisellar lesions that can mimic pituitary adenomas. In this brief overview, the presentation, classification, and general investigation of pituitary lesions is followed by a discussion of the diagnosis and management of specific secretory subtypes. In this paper an attempt is made to understand the pituitary gland disorder in Ayurveda. There is no direct reference for the pituitary gland disorder but on the basis of its clinical presentation, it can be correlated with different entities which one explained either as symptoms or diseases, so it is difficult to give a single Ayurvedic term for it. It means that it is not possible to give the name to all the diseases. In this regard following points should be considered to diagnose it. As Charaka said, the same provoked humour, according to the diversity of causes and its localisation in different regions, produces many types of diseases. So Ayurveda gives guidelines regarding the management of unnamed diseases on the basis of complete knowledge variation in its *Prakruti, Adhishtana and Samuthana, Vishesha, Dosha, Dushya, Srotas* involved , *Bala* of the *Vyadhi* and *Vyadhita* is more crucial for a *Vaidya*. Therefore, treatment should be initiated after diagnosing the nature of the disease, the different regions of localisation and the special causative factors rather than coining a term in Ayurvedic paralance.

KEYWORDS: Pituitary Gland disorders, anterior pituitary gland disorders, posterior pituitary disorders, Dhatwagnimandhya, ashtaninditiya purisha.

INTRODUCTION

Endocrinology is a scientific and medical discipline with a unique focus on hormones that features a multidisciplinary approach to understanding normal and pathologic hormone production and action, as well as diseases related to abnormal hormone signalling. Endocrine and paracrine systems differ in important respects that illustrate the evolutionary pressures on this distinct cell signalling strategies.[1] Differentiated hormone secreting cells are designed to efficiently synthesize hormones and secrete them in a regulated way. Hormone in the blood stream often are associated with binding proteins to enhance their solubility, protect them from degradation and renal excretion, and regulate their stability in the extracellular spae.

Hormones either act on receptors on the plasma membranes of target cells or move into cells to bind to intercellular receptors; in either case, the target cell is not passive recipient of signals but rather has key roles in regulating hormonal responses. Control of hormones secretion involves integrated inputs from multiple distant targets, nervous system inputs and local paracrine and autocrine factors, all leading to complex patterns of circadian secretion, pulsatile secretion, secretion driven by homeostatic stimuli, or stimuli that lead to secular changes over the life span.[2] Endocrine diseases fall into

broad categories of hormone over production or under production, altered tissue response to hormones or tumours arising from endocrine tissue. Hormones and synthetic molecules designed to interact with hormone receptors are administered to diagnose and treat disease.

The "master gland": The pituitary gland is about the size of a pea. It sits at the base of the brain, roughlybehind the bridge of your nose. It's often called the "master gland" because it produces several hormones and controls other glands, such as the thyroid gland and the adrenal glands. **Nomenclature is from Greek which refers to** ptuo (to spit) and **Latin word** Pituita (mucus). Mucus is produced by the brain and is excreted through the nose by the pituitary.[3]

Ayurveda and modern medicine are derived from different theories of knowledge, especially in regard to their methods and scope. Therefore, the approach to a particular disease and diagnosis differs extensively making it quite impossible to make one to one correlation or pick up equivalent terms. At the same time without an Ayurvedic diagnosis it is difficult for an Ayurvedic physician to visualize a complete treatment for the patient. For the same, Ayurvedic classics strongly emphasize that it is not necessary to name every disease and suggest understanding the disease in terms of *Nidana, Dosha* and *Dushya* as well as stages of progress of the disease for succeeding in treatment. For these diseases which have not been named or listed in the texts, the treatment should be planned keeping into consideration the *Vikara Prakriti, Adhishthana* and *Nidana* of the same.

In the pride of India i.e., Ayurveda there is no clear cut evidence of Pituitary Gland disorders but on the basis of its clinical presentation, it can be correlated with different entities which one explained either as symptoms or diseases, so it is difficult to give a single Ayurvedic term for it. There are many systems which involves in the pathogenesis of hypothyroidism. The mixed signs and symptoms of all these systems lead to a complex clinical picture of hypothyroidism. *Acharya Charaka* tried to correlate conditions of abnormal growth & development which is commonly seen in endocrinal disorders with the concept of *Astanindita Purusha.*

Anatomy and Physiology of Pituitary Gland

The hypothalamus–pituitary complex can be thought of as the "command centre" of the endocrine system. This complex secretes several hormones that directly produce responses in target tissues, as well as hormones that regulate the synthesis and secretion of hormones of other glands. In addition, the hypothalamus–pituitary complex coordinates the messages of the endocrine and nervous systems.[4] In many cases, a stimulus received by the nervous system must pass through the hypothalamus–pituitary complex to be translated into hormones that can initiate a response. The hypothalamus is a structure of the diencephalon of the brain located anterior and inferior to the thalamus.

It has both neural and endocrine functions, producing and secreting many hormones. In addition, the hypothalamus is anatomically and functionally related to the pituitary gland (or hypophysis), a bean-sized organ suspended from it by a stem called the infundibulum (or pituitary stalk). The pituitary gland is cradled within the sellaturcica of the sphenoid bone of the skull. It consists of two lobes that arise from distinct parts of embryonic tissue: the posterior pituitary (neurohypophysis) is neural tissue, whereas the anterior pituitary (also known as the adenohypophysis) is glandular tissue that develops from the primitive digestive tract. The hormones secreted by the posterior and anterior pituitary, and the intermediate zone between the lobes are summarized.

There are two lobes Pituitary Gland a) Anterior Lobe b) Posterior Lobe

Anterior Lobe consists of three types of cells depending on the staining reactions i.e. chromophobes (no staining with dyes), acidophils (affinity for acidic stains) and basophils (affinity for basic dyes). The acidophilic cells chiefly produce growth hormone and prolactin. while basophils produce adrenocorticotrophic hormone (ACTH). Chromophobes do not secrete hormones. Though a large number of hormones are secreted by the pituitary but the diseases produced by them are not clinically seen. Tumours of the pituitary are common which may lead to symptoms of excess of one or more hormones and simultaneous deficiency of other hormones, hence, mixed picture may evolve. Hypopituitarism is a common condition due to autoimmune phenomenon and results in a symptom complex due to deficiency of various hormones. The common pituitary disorders seen in clinical practice are gigantism, acromegaly, dwarfism, prolactinoma, hypopituitarism and diabetes insipidus.

Posterior Lobe is in fact a storage organ for antidiuretic hormone (ADH) and oxytocin, both nonpeptides are produced by supraoptic and paraventricular nuclei of hypothalamus.[5] This means damage to the stalk or pituitary gland does not prevent synthesis and release of ADH and oxytocin ADH has been discussed in diabetes insipidous. Oxytocin produces milk ejection and uterine contraction during parturition.

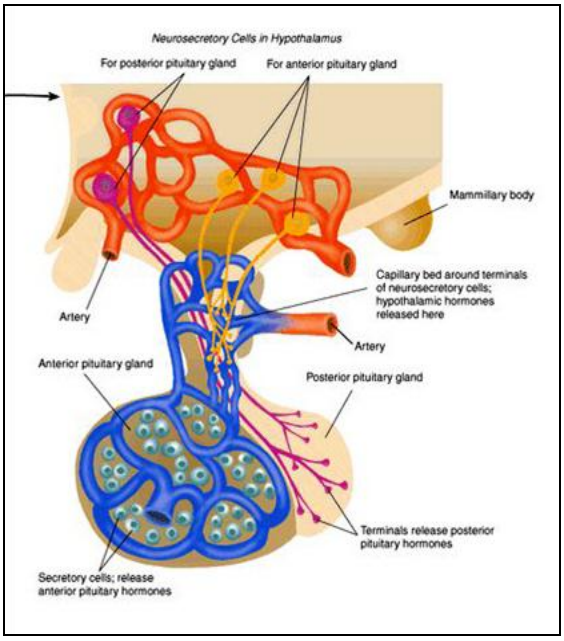

Figure 1:

Classification of Pituitary Gland

There are two major classification of pituitary gland

a) Anterior Pituitary
b) Posterior Pituitary

Posterior Pituitary

The posterior pituitary is actually an extension of the neurons of the paraventricular and supraoptic nuclei of the hypothalamus. The cell bodies of these regions rest in the hypothalamus, but their axons descend as the hypothalamic–hypophyseal tract within the infundibulum, and end in axon terminals that comprise the posterior pituitary The posterior pituitary gland does not produce hormones, but rather stores and secretes hormones produced by the hypothalamus. The paraventricular nuclei produce the hormone oxytocin, whereas the supraoptic nuclei produce ADH[6]. These hormones travel along the axons into storage sites in the axon terminals of the posterior pituitary. In response to signals from the same hypothalamic neurons, the hormones are released from the axon terminals into the bloodstream.

a) Oxytocin

This hormone helps control reproductive system functions, including birth and lactation. When fetal development is complete, the peptide-derived hormone oxytocin (tocia- = "childbirth") stimulates uterine contractions and dilation of the cervix. Throughout most of pregnancy, oxytocin hormone receptors are not expressed at high levels in the uterus. Toward the end of pregnancy, the synthesis of oxytocin receptors in the uterus increases, and the smooth muscle cells of the uterus become more sensitive to its effects.

Oxytocin is continually released throughout childbirth through a positive feedback mechanism. As noted earlier, oxytocin prompts uterine contractions that push the fetal head toward the cervix. In response, cervical stretching stimulates additional oxytocin to be synthesized by the hypothalamus and released from the pituitary. This increases the intensity and effectiveness of uterine contractions and prompts additional dilation of the cervix. The feedback loop continues until birth.

Although the mother's high blood levels of oxytocin begin to decrease immediately following birth, oxytocin continues to play a role in maternal and newborn health. First, oxytocin is necessary for the milk ejection reflex (commonly referred to as "let-down") in breastfeeding women. As the newborn begins suckling, sensory receptors in the nipples transmit signals to the hypothalamus. In response, oxytocin is secreted and released into the bloodstream. Within seconds, cells in the mother's milk ducts contract, ejecting milk into the infant's mouth. Secondly, in both males and females, oxytocin is thought to contribute to parent–newborn bonding, known as attachment. Oxytocin is also thought to be involved in feelings of love and closeness, as well as in the sexual response.

b) Antidiuretic Hormone (ADH)

ADH helps your kidneys manage the amount of water in your body.

The solute concentration of the blood, or blood osmolarity, may change in response to the consumption of certain foods and fluids, as well as in response to disease, injury, medications, or other factors. Blood osmolarity is constantly monitored by osmoreceptor specialized cells within the hypothalamus that are particularly sensitive to the concentration of sodium ions and other solutes. In response to high blood osmolarity, which can occur during dehydration or following a very salty meal, the osmoreceptors signal the posterior pituitary to release antidiuretic hormone (ADH).

The target cells of ADH are located in the tubular cells of the kidneys. Its effect is to increase epithelial permeability to water, allowing increased water reabsorption. The more water reabsorbed from the filtrate, the greater the amount of water that is returned to the blood and the less that is excreted in the urine. A greater concentration of water results in a reduced concentration of solutes. ADH is also known as vasopressin because, in very high concentrations, it causes constriction of blood vessels, which increases blood pressure by increasing peripheral resistance. The release of ADH is controlled by a negative feedback loop. As blood osmolarity decreases, the hypothalamic osmoreceptors sense the change and prompt a corresponding decrease in the secretion of ADH. As a result, less water is reabsorbed from the urine filtrate. Interestingly, drugs can affect the secretion of ADH.

For example, alcohol consumption inhibits the release of ADH, resulting in increased urine production that can eventually lead to dehydration and a hangover. A disease called diabetes insipidus is characterized by chronic under production of ADH that causes chronic

dehydration. Because little ADH is produced and secreted, not enough water is reabsorbed by the kidneys. Although patients feel thirsty, and increase their fluid consumption, this doesn't effectively decrease the solute concentration in their blood because ADH levels are not high enough to trigger water reabsorption in the kidneys. Electrolyte imbalances can occur in severe cases of diabetes insipidus.

Anterior Pituitary

The anterior pituitary originates from the digestive tract in the embryo and migrates toward the brain during fetal development. There are three regions: the pars distalis is the most anterior, the pars intermedia is adjacent to the posterior pituitary, and the pars tuberalis is a slender "tube" that wraps the infundibulum. Hypothalamic hormones are secreted by neurons, but enter the anterior pituitary through blood vessels. Within the infundibulum is a bridge of capillaries that connects the hypothalamus to the anterior pituitary. This network, called the hypophyseal portal system, allows hypothalamic hormones to be transported to the anterior pituitary without first entering the systemic circulation.[7]

The system originates from the superior hypophyseal artery, which branches off the carotid arteries and transports blood to the hypothalamus. The branches of the superior hypophyseal artery form the hypophyseal portal system. Hypothalamic releasing and inhibiting hormones travel through a primary capillary plexus to the portal veins, which carry them into the anterior pituitary. Hormones produced by the anterior pituitary (in response to releasing hormones) enter a secondary capillary plexus, and from there drain into the circulation. The anterior pituitary produces seven hormones. These are the growth hormone (GH), thyroid-stimulating hormone (TSH), adrenocorticotropic hormone (ACTH), follicle-stimulating hormone (FSH), luteinizing hormone (LH), beta endorphin, and prolactin. Of the hormones of the anterior pituitary, TSH, ACTH, FSH, and LH are collectively referred to as tropic hormones (trope- = "turning") because they turn on or off the function of other endocrine glands.

a) Growth Hormone

The endocrine system regulates the growth of the human body, protein synthesis, and cellular replication. A major hormone involved in this process is growth hormone (GH), also called somatotropin—a protein hormone produced and secreted by the anterior pituitary gland. Its primary function is anabolic; it promotes protein synthesis and tissue building through direct and indirect mechanisms. GH levels are controlled by the release of GHRH and GHIH (also known as somatostatin) from the hypothalamus. A glucose-sparing effect occurs when GH stimulates lipolysis, or the breakdown of adipose tissue, releasing fatty acids into the blood. As a result, many tissues switch from glucose to fatty acids as their main energy source, which means that less glucose is taken up from the bloodstream.

GH also initiates the diabetogenic effect in which GH stimulates the liver to break down glycogen to glucose, which is then deposited into the blood. The name "diabetogenic" is derived from the similarity in elevated blood glucose levels observed between individuals with untreated diabetes mellitus and individuals experiencing GH excess. Blood glucose levels rise as the result of a combination of glucose-sparing and diabetogenic effects. GH indirectly mediates growth and protein synthesis by triggering the liver and other tissues to produce a group of proteins called insulin-like growth factors (IGFs). These proteins enhance cellular proliferation and inhibit apoptosis, or programmed cell death. IGFs stimulate cells to increase their uptake of amino acids from the blood for protein synthesis. Skeletal muscle and cartilage cells are particularly sensitive to stimulation from IGFs.

Dysfunction of the endocrine system's control of growth can result in several disorders. For example, gigantism is a disorder in children that is caused by the secretion of abnormally large amounts of GH, resulting in excessive growth. A similar condition in adults is acromegaly, a disorder that results in the growth of bones in the face, hands, and feet in response to excessive levels of GH in individuals who have stopped growing. Abnormally low levels of GH in children can cause growth impairment—a disorder called pituitary dwarfism (also known as growth hormone deficiency).

b) Thyroid-Stimulating Hormone

The activity of the thyroid gland is regulated by thyroid-stimulating hormone (TSH), also called thyrotropin. TSH is released from the anterior pituitary in response to thyrotropin-releasing hormone (TRH) from the hypothalamus. As discussed shortly, it triggers the secretion of thyroid hormones by the thyroid gland. In a classic negative feedback loop, elevated levels of thyroid hormones in the bloodstream then trigger a drop in production of TRH and subsequently TSH[8].

c) Adrenocorticotropic Hormone

The adrenocorticotropic hormone (ACTH), also called corticotropin, stimulates the adrenal cortex (the more superficial "bark" of the adrenal glands) to secrete corticosteroid hormones such as cortisol. ACTH come from a precursor molecule known as pro-opio melanotropin (POMC) which produces several biologically active molecules when cleaved, including ACTH, melanocyte-stimulating hormone, and the brain opioid peptides known as endorphins. The release of ACTH is regulated by the corticotropin-releasing hormone (CRH) from the hypothalamus in response to normal physiologic rhythms. A variety of stressors can also influence its release.

d) Follicle-Stimulating Hormone and Luteinizing Hormone

The endocrine glands secrete a variety of hormones that control the development and regulation of the reproductive system (these glands include the anterior pituitary, the adrenal cortex, and the gonads—the testes

in males and the ovaries in females). Much of the development of the reproductive system occurs during puberty and is marked by the development of sex-specific characteristics in both male and female adolescents. Puberty is initiated by gonadotropin-releasing hormone (GnRH), a hormone produced and secreted by the hypothalamus.

GnRH stimulates the anterior pituitary to secrete gonadotropins—hormones that regulate the function of the gonads. The levels of GnRH are regulated through a negative feedback loop; high levels of reproductive hormones inhibit the release of GnRH. Throughout life, gonadotropins regulate reproductive function and, in the case of women, the onset and cessation of reproductive capacity. The gonadotropins include two glycoprotein hormones: follicle-stimulating hormone (FSH) stimulates the production and maturation of sex cells, or gametes, including ova in women and sperm in men. FSH also promotes follicular growth; these follicles then release estrogens in the female ovaries. Luteinizing hormone (LH) triggers ovulation in women, as well as the production of estrogens and progesterone by the ovaries. LH stimulates production of testosterone by the male testes.

e) Prolactin

As its name implies, prolactin (PRL) promotes lactation (milk production) in women. During pregnancy, it contributes to development of the mammary glands, and after birth, it stimulates the mammary glands to produce breast milk. However, the effects of prolactin depend heavily upon the permissive effects of estrogens, progesterone, and other hormones. And as noted earlier, the let-down of milk occurs in response to stimulation from oxytocin. In a non-pregnant woman, prolactin secretion is inhibited by prolactin inhibiting hormone (PIH), which is actually the neurotransmitter dopamine, and is released from neurons in the hypothalamus. Only during pregnancy do prolactin levels rise in response to prolactin-releasing hormone (PRH) from the hypothalamus.

Prolactinomas:

Tumor of pituitary is prolactinoma. There are 3 types of Prolactinomas:

A. 90% of the Prolactinomas have < 1 cm size - microadenomas-20: 1 (F: m)

B. 9% of the Prolactinomas have 1-4 cm size - microadenomas - 1:1 (F: m)

C. 1% of the Prolactinomas have > 4 cm size - giant prolactinomas - 1:1(F: m)

Prolactinomas generally occur at the age of as- 45yrs, mostly in Females - A Prolactinoma which is occurring at an age<20yrs is due to a genetic syndrome unless proven otherwise. The 3 Genetic syndromes associated with Prolactinomas are

1. MEN - 1 syndrome
2. mccune Albright syndrome
3. Carney's complex

A tumour occurring in a female (as-45 years) generally presents with hormonal effects rather than mass effect or stalk effect because 90% of them are microadenomas. In males, they are diagnosed late clinical presentation in 25-45 year old females:

1) Galactorrhea Amenorrhoea Complex (Mc)
2) Infertility For Evaluation (Leuteal Phase Dysfunction)

In males, the mc presentation - loss of libido, erectile dysfunction. Prolactinomas can produce osteoporosis of spine. Prolactiomas can also cause insulin resistance Active space.

Screening test of choice

- ❖ Fasting prolactin levels
- ❖ If >100 ug/L - It can probably due to a tumor
- ❖ if >aso ug/L - its definitely a tumor

Hook effect

- ❖ The patient has got a tumor, but prolactin levels are normal
- ❖ The patient will have symptoms repeat the test in serial dilutions macroprolactin: very high prolactin levels in the absence of tumor. Patient is asymptomatic. This is functionally insignificant macroprolactin. measure the levels of macroprolactin (macro) specifically

Confirmatory test

- ❖ Gadolinium enhanced MRI

- Prolactinomas do not take up contrast uniformly

- ❖ Indications of treatment:

-All macroadenomas and symptomatic microadenomas must be treated

- Asymptomatic microadenomas are not treated Repeat mri after 6-8wks increase in tumor size treated

Repeat MRI after 6 – 9wks – increase in tumor size – treated

Gigantism

It is a clinical condition that occurs due to an excess of GH during adolescents i.e. before the fusion of epiphysis. There is increase in linear growth i.e height and person becomes 'giant'. Moderate gigantism is not uncommon and is usually associated with considerable muscular strength. This is probably due to the large quantity of androgens secreted by the overactive adrenals, with or without multiple adenoma formation, the adrenal activity being secondary to f pituitary hyper function.

Gigantism is, however, not necessarily complicated by acromegaly and the associated strength may endure throughout life. Recently we have seen a team of overseas golfers whose exceptional skill was paralleled by their exceptional height, strength and muscular development[9]. Their hands were big and enfolded the golf club in an embracing powerful grip. One physically miniature British golfer defeated their most massive

representative by greater skill and timing, but that does not negative the above general impressions or the obvious advantages, other things being equal, of hyper functioning pituitary and adrenal glands within physiological limits.

As to historical giants, Gibbon in the second edition (1776) of his classical work gives the following description of a young Thracian peasant who was later to become the Emperor and inhuman tyrant Maximin. Having floored in succession 16 of the stoutest camp followers at the military games Been, on the following day, attracted the notice of the Emperor Alexander Severus by easily keeping pace with him on horseback over a long distance. Asked by the Emperor whether he would wrestle after his race, he was at once matched against seven of the strongest soldiers in the Army simultaneously, and gained the verdict with ease. His stature, according to Gibbon, exceeded 8 ft. He could draw a loaded wagon, break a horse's leg with his fist, crumble stones in his hand and tear up trees by the roots. His appetite was in keeping with his strength, for he would drink an amphora (about 7 gal.) of wine and eat 30 to 40 lb. of meat daily. Wrestling, incidently, continues to be a sport which attracts relative giants with or without acromegalic features.

It might well be argued that tall people are not always strong and some are definitely weaker than the average. Gigantism is due to a pituitary eosinophil adenoma, optic atrophy is not uncommon. In one girl of 14 seen in out-patients because of unduly rapid growth (5 ft. 1 in.) and some enlargement of the hands, papilloedema was a surprising finding. A ventriculogram revealed dilatation of the third ventricle; and the autopsy, after a cerebral operation, showed stenosis of the aqueduct of Sylvius by an astrocytoma. Gigantism, or giantism, is often associated with mild acromegaly within what might be termed almost physiological limits, resulting in virile attractive personalities. Many a ' he-man ' of the films owes his box office attraction to his pituitary gigantic skeletal development, his resolute prognathic lower jaw and his deep vibrant voice, emanating from an overdeveloped acromegalic larynx.

Acromegaly

If GH excess occurs after fusion of epiphysis, then enlargement of acral parts (hands, fingers, feet and toes) occurs leading to increase in their width rather length. The height of pure acromegalic's is more or normal. This is more common than gigantism. GH exerts its growth promoting effects by stimulating the release of IGF-1 from liver and other tissues[10]. Delayed puberty and delayed union of the epiphyses permitting an excess of growth hormone to act on the long bones over an excessive period of time, form an intermediate group. The disease usually commenced at about the age of puberty, e.g. 12 years. Always we need to remember is Acromegalic face i.e. Broad thick nose, thickening of skin, prominent eye brows, coarsening of facial features. Prognathsim (elonagtion and widening of mandible), Spade like hands and feet wit short, thick stout fingers and toes.

Table 1:

SYSTEMIC CLINICAL FEATURE
Mass effects of the tumor • Headache • Visual field defects • Hyper prolactinemia • Pituitary stalk section • Hypopituitarism • Hypothyroidism, hypogonadism, hypocortisolism
Systemic effects of GH/IGF-I excess • Visceromegaly Soft tissue and skin changes • Thickening of acral parts • Increased skin thickness and soft tissue hypertrophy • Hyperhydrosis/Oily texture • Skin tags and acanthosis nigricans
Cardiovascular features • Hypertrophy (biventricular or asymmetric septal) • Congestive Heart Failure (systolic and/or diastolic) • Coronary disease • Arrhythmias • Hypertension´ • Cardiomyopathy
Metabolic features • Impaired glucose tolerance • Diabetes mellitus • Insulin resistance
Respiratory manifestations

○ Macroglossia ○ Jaw malocclusion ○ Upper airway obstruction ○ Sleep disturbances ○ Sleep apnea (central and obstructive) ○ Ventilatory dysfunction
Bone and joint manifestations ○ Increased articular cartilage thickness ○ Arthralgias and arthritis ○ Carpal tunnel syndrome Osteopenia
Other endocrine consequences ○ Goiter ○ Hypercalciuria ○ Galactorrhea ○ Decrease libido, impotents ○ Menstrual abnormalities

Mixed Disorder

If excess of GH occurs in adolescence and continues during adult life, then a mixed picture of acromegaly and gigantism is evolved. The causes are seen in Acromegaly/gigantism is always due to a pituitary adenoma, rarely by carcinoma. The tumour is locally invasive into cavernous sinus. It may be associated with MEN type 1 (multiple endocrine neoplasia) syndrome. Rarely, it may be caused by ectopic GHRH or GH secreted by lymphoma, pancreatic tumour, carcinoid tumour. The most common cause of acromegaly and gigantism is a pituitary tumour, which not only produces clinical symptoms and signs due to excess of GH but produces local effects due to compression or alteration of pituitary fossa.

The symptoms of external compression include headache, cranial nerves palsy and visual field defects. Pituitary fossa enlarges antero posteriorly. The tumour produces compression of other cells in the pituitary itself leading to deficiency of other hormones (e.g. hypogonadism, hypothyroidism, hypoadrenalism). Prolactin levels are elevated in some patients. GH acts on all the somatic cells but noticeable changes are seen in skin, soft tissues, bones, hands and feet. The clinical features of gigantism are same except that they are taller than individuals of the same age.[11]

Dwarfism

Normal well nourished children have similar growth rates. The approximation for the average length of children gives rough idea of retarded growth. At birth the child is born with about 50 cm in length, then be she increases by 25 cm in the first year of life, 125 cm in the 2nd year of life. Subsequently he/she increases by 6.5 cm every year throughout until puberty, but this formula is workable upto 8-10 years of age in both sexes The best way is to keep the height and weight record on percentile chart. If a child is below 3rd percentile or has a measurement across the central lines on serial estimations, should be investigated. The parental height should be taken into consideration as follows:

Formula for calculation of height from midparental height

For boys: $\frac{\text{Maternal height} + 14\text{ cm} + \text{paternal height}}{2}$

For girls: $\frac{\text{Paternal height} - 14\text{ cm} + \text{maternal height}}{2}$

Causes of dwarfism are Short stature or dwarfism may be due to endocrinal or nonendocrinal causes, The children with endocrinal causes are bulky and overweight, while those with nonendocrinal causes are underweight.

Diabetes Insipidus

It is disorders of posterior pituitary. Deficiency of vasopressin/ADH release results in a clinical condition called diabetes insipidus. When this condition results from unresponsiveness of renal distal convoluted tubules to ADH, it is called nephrogenic diabetes insipidus. Causes seen in Diabetis insipidus in starts in childhood or early middle life, and is more common in males than females. The symptoms and signs are Polyuria (passage of 2-10L of urine), Polydypsia (increased thirst), especially with a craving for ice water, Urine of low specific gravity <1.006, Pale coloured dilute clear urine which is otherwise normal, Low urine osmolality, Symptoms and signs of hyponatremia and dehydration i.e., dry tongue, dry mouth, fall in Blood pressure may be seen in acute severe cases.[12,13]

Understanding the Concept in Ayurveda

Ayurveda and modern medicine are derived from different theories of knowledge, especially in regard to their methods and scope. Therefore, the approach to a particular disease and diagnosis differs extensively making it quite impossible to make one to one correlation or pick up equivalent terms. At the same time without an Ayurvedic diagnosis it is difficult for an Ayurvedic physician to visualize a complete treatment for the patient. For the same, Ayurvedic classics strongly emphasize that it is not necessary to name every disease and suggest understanding the disease in terms of *Nidana*, *Dosha* and *Dushya* as well as stages of progress of the disease for succeeding in treatment[14]. For those diseases which have not been named or listed in the

texts, the treatment should be planned keeping into consideration the *Vikara Prakriti, Adhishthana* and *Nidana* of the same. In Ayurveda there is no clear cut evidence of Pituitary gland disorders, but on the basis of its clinical presentation, it can be correlated with different entities which one explained either as symptoms or diseases, so it is difficult to give a single Ayurvedic term for it. Acharya Charaka's Concept on *Astanindita Purusha* can be correlated to abnormal growth & development which is commonly seen in endocrinal disorders.[15]

न हि सर्वविकाराणां नामतो अस्ति ध्रुवा स्थिति: I[16]
तस्मात् विकार प्रकृतिरधिष्टानान्तराणि च II
समुत्थान भुध्वा कर्म समाचरेत् I

It means that it is not possible to give the name to all the diseases. In this regard following points should be considered to diagnose it. As Charaka said, the same provoked humour, according to the diversity of causes and its localisation in different regions, produces many types of diseases. So Ayurveda gives guidelines regarding the management of unnamed diseases on the basis of complete knowledge variation in its *Prakruti, Adhishtana and Samuthana, Vishesha, Dosha, Dushya, Srotas* involved, *Bala* of the *Vyadhi* and *Vyadhita* is more crucial for a *Vaidya*. Therefore, treatment should be initiated after diagnosing the nature of the disease, the different regions of localisation and the special causative factors rather than coining a term in Ayurvedic paralance. (Ch. Su. 18/45-46). Further he said, *Vata, Pitta* and *Kapha*, reside either in their normal or pathological state in the bodies of all embodied creatures. Hence, the learned physician should desire to recognise them. Taking all into consideration, an attempt is made to understand the Pituitary disorders in terms of Ayurveda.

Concept of *Agni* and pituitary disorders

Man and Universe have been composed of *Pancha mahabhutas* and *Avyakta*. The Living body which is made up of *Pancha mahabhutas* always undergo 'Wear and Tear' phenomenon because of essential daily activities otherwise, we can narrate it that two processes are continuously going on imitatively in our body – *Chaya* and *Apachaya*. Their balance keeps *dhatus* in equilibrium and keeps disease away. To maintain this balance, a physician should concentrate on the kind of energy which is responsible for all the physical and biochemical transformations in the body and also which comprehends various factors which participates and directs the course of digestion & metabolism. This energy has been termed as 'Agni'. In common language, Agni means fire. Sun signifies the agni in universe, which exists in the body as 'Kayagni'.[17]

So in the functioning of Living organisms it acts by its *Pakadi Karmas* which includes various bio-physical and bio-chemical processes. The detailed study pertaining to the physiology of thyroid gland reveals that it controls almost all the metabolic activities of the body, which according to Ayurveda are functions attributed to agni, one of the great concepts of Ayurveda. The many fold functions of Agni are ascribed to Pitta which not only includes chemical agencies responsible for *Aharapachana* in the *kostha*, leading to the separation of *sarabhaga* of *ahara* from the *kittabhaga*, but also the maintenance of the body processes like metabolism and energy synthesis.[18] Thus, here lies the importance for the knowledge regarding the concept of Agni; its nature, function and diseases caused due to vitiation of *agni* which is self-evident to understand the functions of thyroid gland in the light of Ayurveda.

Broadly three kinds of Agni have been mentioned in *Samhitas*. They are as follows

1. *Pachakagni*

Pachakagni is given higher position among them, which is mainly concerned with chemical processes involved in gastro-intestinal digestion

2. *Dhatvagni*

It is concerned with transformation as well as production of new basic tissues i.e; *Dhatus* and its associates.

3. *Bhutagni*

Bhutagni are related to the *mahabhuta paka*. This is only a broad classification; different *acharyas* give different accounts of *Agni's* presence in various levels

Acharya Charaka considered *agni* as a separate entity coming under the category of *pitta* by saying *"agnireva sarire pitäntargata"*, however Susrutha considered *Agni* is nothing but *pitta* in human body. The many fold functions of *agni* are ascribed to *Pitta*, which in normal state, performs *pachana* (digestion), *dahana* (burning, combustion or oxidation) including *bhinnasamghata, tapana* (heat production), *parinamana* (conversion), *pravritthi* (transformation), *prakasana* (illumination), *ranjana*(colouration) and *prabhakarana* (enhancing the lusture) in Human body.

Charaka while explaining the importance of *agni*, states that whole life of human being is dependent on Agni. It is the root cause for lifespan, complexion, bodily strength, lusture, healthy and unhealthy condition of the body, enhancement of *Oja, teja* and maintenance of all bodily functions. A person can enjoy life without any disorders if his *agni* performs normally. In a perturbed condition of Agni, the person suffers from diseases and later ends up his life into death before the full span. While explaining the relation between the *jataraagni* and *dhatwagni*, Acharya Vagbhata opines that, the *pachakagni* which is located in the area between *pakwashaya* and *amashaya* contribute parts of itself to the *dhatus* and further states that the moieties of *pachakagni* present in *dhatus*, when hyper active leads to their wasting and hypo active leads to hypertrophy which means that the metabolic activities that are taking place in the body are only dependent on the functions of *Jataraagni* and *dhatwagnis*.

A decrease or an increase of *dhatu* occurs depending upon the *tikshnata* or *mandata* of those miotiese of *pachakagni* present in *dhatus*. Ayurveda accepts the *dhatupaka* as the result of gradual synthesis of a *dhatu* from the previous *dhatu* by the digestive or metabolic action of the corresponding *dhatu*. The nutrients which nourish the *dhatus* undergoes *paka* by the own *ushma* of the *dhatu* and later they are made available to the *dhatu* through their srotas. *Dhatu paka* is a very complex process and different acharyas are having separate opinions on this process. Acharya Chakrapani and Dalhana in their historical commentaries detailed these procedures with three chief laws *Ksheeradadhi Nyaya, Khale kapota Nyaya, Kedari kulya Nyaya*.

Interpreting the views of *Charaka, Chakrapāni* had described the *Kşiradadhi nyaya*. It explains that like milk is completely converted to curd, curd to *navanita* and *navanita* to *ghrita*; *dhâtus* are also converted from the previous to the next completely. It is also termed *kramaparimana* or *sarvatmaparināma paksa*. Many authors are not satisfied with this explanation because it has got many controversies. *Acharya Dalhana* later clarified the fact saying that when a *dhatu* undergoes *paka* it is converted to three parts

1. *Anu bhaga*,
2. *Sthula bhaga*
3. *Mala bhaga.*

The *anu bhaga* acts as the precursor for the next *dhatu*, *Sthula blaga* nourishes the *dhatu* itself and the *malabhaga* forms the *dhatu-mala*. The *upadhatu* is also formed from the *sthulabhāga* along with the *dhatu.*
Acharya Charaka told in different context that a *dhatu* is having two part

1. *Prasada bhaga*
2. *Kitta bhaga*

Chakrapani explains that the *rasa* is having two parts

1. *Sthayi Poshya*
2. *Poshaka.*

Kedara kulyä nyaya mostly satisfies *Sushruta's* view. It explains that like a canal supplies the water to the nearer field first and proceeds to the next later, gradually supplying all fields from the same source; *dhatus* are also nourished by the same *rasa* and the nearer *dhatu* is nourished prior to the later *dhatu*.

Khalekapota nyaya mostly follows the view of *Vagbhata*. Like the pigeons collecting the grains from a field have the same source and have separate path to their home and the nearer pigeon reaches its home faster than the distant pigeon, *dhatus* are also nourished from the same source and through their own *srotas* and the nearer *dhatus* is nourished prior to the later.

Arunadatta give another view of *Ekakala dhatu posana paksa*, according to which all *dhatus* are simultaneously nourished from the *rasa*.

In this way different opinions are put forward by various authorities, but it obeys basically same concept that all *dhatus* are metabolised from the basic *rasa* produced by *kayagni* and *bhutagni paka*, which again by the action of the specific *dhatvagni paka* forms the specific *dhatu*. All demonstrate the same order of *dhatuparinamana*. So, sluggishness in the *agni* increases the dhatu level and a higher active state reduces the dhatu level in the body.

Considering these facts we can see that in pituitary gland disorder nearly all *dhatus* are affected due to *dhatvagni mandya*. Mostly the primary *rasadhatu* is affected more; hence we get more *rasadhatu vṛddhi lakṣaṇa* as discussed before. As a result of *dhatvagni mandya both the dhatu, updhatus* as well as mala production are affected that we can see in later discussion.

Involvement of *Doshas* in pituitary Disorders

The *Doshas* are said to perform *Dharana* of *Shareera* in their *Prakruta Avastha* but in their morbid state they hold the ability to vitiate other *Doshas* and *Dhatus* and hence they are also attributed as *Malas*. These *Doshas* have the capacity to get vitiated independently and produce pathology. Vata Dosha is said to have qualities of *Vayu* and *Akasha Mahabhoota*, *Pitta* having qualities of *Agni Mahabhoota* while *Kapha* has properties of *Ap* and *Prithwi Mahabhoota.*

Various treatment approaches in pituitary gland disorders are Health is like a *Sharira, Indriya, Satva* and *Atma* vehicle which run only on the balanced motion of four wheels viz. Any deterioration to above leads to diseased condition. To get rid of this deterioration, *Chikitsa* is essential. *Chikitsa* derives measures adapted to the removal of the factors of the disease. It not only directs towards removal of causative factors but also aims at *Doshika* equilibrium. *"Samshodhanam Samshamanam Nidanasya Cha Varjanam"* Thus, in any disorder, the management is divided into 3 parts: *Nidana Parivarjana, Samshodhana, Samshamana.*

DISCUSSION

Discussion on Disease

The pituitary gland has come to be regarded as the master key of the endocrine system in so far as it influences the activity of the remaining glands, but a reciprocal influence in the opposite direction is equally important. Hypophysectomy results in diminished function and some degree of atrophy in the gonads, adrenals, thyroid, pancreas, and less certainly of the parathyroids; and conversely the chemists have extracted from the anterior pituitary different fractions which stimulate these glands. These factors, e.g. thyrotropic, when injected for some days or weeks produce antibodies in the blood, e.g. antithyrotropic, which inhibit or prevent their activity. The pituitary is also concerned with growth, adiposity, emaciation, temperature control, diuresis and antidiuresis, sleep, blood pressure, hair and appetite. Extracts can produce diabetes, ketosis, exophthalmos even after

thyroidectomy, milk secretion, and melanophore expansion. The pituitary gland is surrounded by the hypothalamic region of the brain which includes the tuber cinereum, corpora mamillaria, and a large number of separate nerve centre or nuclei. Nearly all the influences of the pituitary gland can be produced by lesions in the neural tissue surrounding the gland and separate centres are being detected for different functions.

Discussion on Treatment

Nidana Parivarjana

Both Charaka and Sushruta have laid great emphasis on the principle of *Nidana Parivarjana*. Sushruta in particular has recommended *Nidana Parivarjana* as an essential component in the management of any disorder. This can be well interpreted as *"Sankshepta Kriyayoga Nidana Parivarjanam"* by Sushruta. *Nidana Parivarjana Chikitsa* means avoiding all the *Aharatmaka, Viharatmaka Manasika* and *Anya Nidana* responsible directly or indirectly for the manifestation of a disease. All the Nidana mentioned earlier, such as *Ati Madhura, Guru, Snigdha, Abhishyandi Ahara Sevana, Divaswapna* etc. should be avoided in case of Pituitary disorder. According to Ayurveda, the predominant vitiated *dosha* should be treated first and treatment of the other subordinate *doshas* should be undertaken afterwards. Acharya charaka has emphasized that the management of the diseases, which show their effect all over the body, is difficult to manage. For such *Bahudoshawastha* conditions, proper *shodhana* and *shamana* therapies are necessary. Pituitary disorders are such a disease which affects whole body and usually with a chronic course. The four types of therapies in which the vitiated *Dosha* are eliminated after mobilizing them from their respective sites by *Urdhva* or *Adha marga* from the body is known as *Shodhana* therapy. Being a syndrome entity *Samshodhana* therapy is highly recommended for the management of *santarpanjanya vyadhi* by Charaka.

Langhana Chikitsa is the Line of treatment for *Rasapradoshaja Vikara* and *Rasavaha Srotodushti* which also includes the following treatment: *Vamana karma, Virechana Karma, Nasya karma, Basti karma*.

Vamana

Vamana has its own importance. For *urdwajatru gata vyadhis* and *kaphaja* disorders, *Vamana karma* is considered as best line of purificatory measure and best *sroto shodaka*. In the treatment of Pituitary Gland disorder, considering the *Kapha dosha* dominance, and *Jataragni, dhatwagni mandhya* and thereby keeping the impairment of metabolism as base, where as in conditions like *amadoshayukta* and *kapholbana* condition *Vamana* could be advised. For *Srotoshodaka, Agnivardaka, Vyadhi-pratyanika* and *Dosha-pratyanika chikitsa, Vamana karma* is selected. Acharyas suggests *shodhana* therapy in *bahu doshaavastha* and in *kapha dosha* dominant diseases especially *Vamana karma* indicated. As *Vamana Karma* being main *chikitsa* for *kapha* dominant and its best *hetu* and *vyadhi pratyaneeka chikitsa* for *kapholbhana vyadhi* given best result. The effect of *vamanakarma* on the entire body system can be explained by the concept of regulation of homeostasis by the nervous system& endocrine system: A hypothetical approach. There is an imbalance of *dosha* in the diseased condition which means normal homeostasis is disturbed.

Analysing Vamana karma helps in this below flow chart-

Due to *Vamana*

↓

Movement of intracellular fluid into the GIT due to strong irritant emetic drug. State of Hypohydration is created (due to the loss of water, electrolytes, proteins and metabolic wastes).

↓

Physiological Eustress created

↓

Stimulation of paraventricular nuclei of Hypothalamus

↓

Stimulates secretion of hormones like Corticotropin releasing hormone, Argenine Vasopressin

↓

Activates Hypophyseal portal system

↓

Activation of Noradrenaline system

↓

ANS & neuro endocrineresponses stimulated (Controlling system)

↓

Helps to restore the normal functioning of other working system

↓

Increased process of healing

Virechana

Virechana therapy is used to expel out increased *Doshas* out of the body through *adhomarga.* It is recommended when the disease and the strength of the patient – both are strong. *Virechana* is indicated for *dosha nirharana* through *adhobhaga*, does *srotoshuddhi* and helps in restoring the *Dhatu Sthirata*. *Agni Deepti* and *Indriya Prasadana* are also obtained by *Virechana.* In Ayurvedic texts like *Triphala Haritaki, Katuki, Aragvadha, Trivruth, Danti Dravanti* etc., which have *Agnivardaka* and *anulomana* etc. property could be used. *Virechana Dravya* leads to inflammation in mucosal cell. Due to inflammatory changes vasoactive amines and polypeptides increases membrane permeability in GIT and cause vasodilation thus waste products where so ever present in the body either in extra-cellular, intracellular or in plasma can be brought into intestine to maintain the homogeneity from where it can be eliminated out of body by the increased propulsive movement of G.I tract, which is induced by *Virechana Dravya*. *Bahu Drava Shleshma, Abadda Medas, Agnimandhya*, and *Srotorodha* are important factors in the pathogenesis of *Sthula Madhumeha*. *Virechana* eliminates the vitiated *Dosha* and *Mala* and clears the channels, which are obstructed by *Shleshma* and *Medas* and removes the *Avarana* and regulates the *Vata*. This *virechana* helps inn Enteric nervous system (ENS) normally communicate with the central nervous system through the parasympathetic (eg. via the Vagus nerve) and sympathetic (e.g. via the Prevertebral ganglia) nervous system. Sensory neurons of the ENS monitor chemical changes within the GIT as well as pressure of its wall. Enteric motor neurons govern contraction of GI tract smooth muscle and activity of GI tract endocrine cells. ENS also makes use of more than thirty neurotransmitters, most of which are identical to the ones found in CNS such as acetylcholine, dopamine, serotonine etc. The enteric nervous system has the capacity to alter its response depending on factors such as bulk and nutrient composition. As the total nervous system is interrelated so this regular stimulation to ENS may have some positive effect over the CNS also and in this way the neuroendocrine regulation may take place.

Basti

Acharya Charaka explained some *Basti* for *Santarpanajanya roga chikitsa*. A number of *Basti kalpa* are also mentioned in Ayurvedic texts which may help to bring *samavastha* of *vayu dusti* in *Samprapti vighatana* in this condition. Commonly we feel that *Basti* is administered into *Pakwashaya*! How It reaches to whole body and cures the disease. So we can understand the concept like Acharya sushrutha has told that the *veerya* of *basti* drug reaches all over the body through the *srotas* in the same way as the water poured at the root of the plant reaches up to leaves. He has further explained that even though *basti* drugs quickly comes out with mala and their *veerya* acts all over the body by the action of *apana vayu* and other *vayu*. The action takes place just like as sun draws moisture from earth. *Parashara* has high lighted the importance of *Guda*, by saying that *Guda* is *mula* for all the *siras* in the body. Hence the medicine administered through the *guda* reaches up to head and nourishes the body.

When we view from the enteric nervous system; The enteric nervous system or intrinsic nervous system is one of the main division of the nervous system and consists of a mesh like system of neurons that governs the function of the GIT system. During embryonic development, the ENS is formed from the same chunk of tissue from which the CNS is formed. This tissue is called the neural crest. The fact that these two system share the same origin makes it less surprising to find that they contain some of the same types of cells, neurotransmitters, brain proteins and that one affects the other. It is now usually referred to as separate from the autonomic nervous system since it has its own independent reflex activity. ENS consists of some 500 million neurons so called the Second Brain. The enteric nervous system is embedded in the lining of GIT system, beginning in the oesophagus and extending down to the anus Stimulation of *basti* either by chemo or mechanic receptors may lead to activation of concerned part of CNS which precipitates results accordingly. Again it is not mandatory for a drug to stay in long time contact to the receptor E.g; Like in proton pump inhibitor where drug interacts and flush out from circulation, it is known as HIT & RUN MODULE of Pharmacodynamics. Same module of pharmocodynamics may be hypothesized for Niruha Basti.

The chemical and mechanical stimulation can be Niruha basti is a hyper osmotic solution which causes movement of solvent from cells of colon to the lumen. It facilitates the absorption of endotoxin and produce detoxification during elimination. Kalka used in basti has got irritant property along with other ingredients which may induce colonic distension. The distension stimulates pressure which produces evacuator reflex. By concludering statement GIT is having its own Brain system. By this we can say that GIT is control by 2 brain systems. Basti chikitsa is ardha chikitsa because of actionon all systems. Basti according to disease, person, kala and with proper medicine can treat any disease and will make a person healthy.

Nasya Karma

As *Adhistana of vyadhi* is and *Udana vata* in *Kanta pradesha*, it is considered as *urdwajaturgata vikara*. *Nasya karma* stimulates the olfactory nerve which acts on higher centres i.e., Hypothalamus and pituitary gland. Hence, the *Nasya* can also helpful to treat the condition of Pituitary disorder and thus acts on endocrine system *Nasya* acts on the neurological pathway as It is concerned with olfactory stimuli. The olfactory nerve differs from other cranial nerves in its close relation with the brain. The peripheral olfactory nerves are chemo-receptor in nature. The olfactory nerves are connected with the higher centres of brain i.e. limbic system,

consisting mainly of amygdaloidal complex, hypothalamus, epitheliums, anterior thalamic nuclei parts of basal ganglia etc. so the drugs administered through nose stimulate the higher centres of brain which shows action on regulation of endocrine and nervous system functions. So Hypothalamus regulates Regulates contraction of smooth and cardiac muscles secretions of many glands.

It is a major regulator of visceral activities includes heart rate, movement of food through the gastrointestinal tract and contraction of bladder. 1. Regulation of hormone synthesis a) Responsible for integrating the functions of the endocrine system and the nervous system. b) It is known to have direct nerve connection with the posterior lobe of pituitary. c) In addition hypothalamus is connected with anterior lobe of pituitary through portal vessels which supply blood to the gland conveying chemical messages through inhibitory and releasing hormone. 2. Regulation of hormone synthesis a) Responsible for integrating the functions of the endocrine system and the nervous system b) It is known to have direct nerve connection with the posterior lobe of pituitary c) In addition hypothalamus is connected with anterior lobe of pituitary through portal vessels which supply blood to the gland conveying chemical messages through inhibitory and releasing hormone. 3. Regulation of emotional and behavioural patterns a) Together with limbic system participate in expression of rage, aggression, pain, pleasure and behavioural pattern relating to sexual arousal etc. b)Regulation of eating and drinking through the arcuate and paraventrical nuclei and thirst centre thus regulating osmotic pressure. 4. Regulates body temperature 5. Regulation of circadian rhythm and states of consciousness 6. Effects of stimulating the amygdaloidal – same as hypothalamus. 7. Epitheliums consisting of pineal gland and habenular nuclei- Pineal gland is a part of endocrine system, secreting mel-atonin and also contributes to the setting of the body's biological clock. 8. Habenular nuclei – involved in olfaction, especially emotional responses to odours. 9. Sub thalamus – contain the sub thalamus nuclei and portions of the red nucleus and the substantianigra. These regions communicate with the basal ganglia help to control body movements. The drug administrated even enters into the systemic circulation and also direct pooling into the intracranial region by vascular path. Example *Tumbi Taila*, *Shakhotaka bimbadi taila*, *Vyoshadhya taila* can be used for *Nasya*.

Samshamana Chikitsa

Shamana is defined as the therapy, which does not do *Shodhana* of the *Dosha*, does not disturb the equation of balanced *Dosha* and simultaneously bring equilibrium of imbalanced *Doshas*. Considering the *Dosha, Dushya* involved, drugs which are *Kapha-Vatahara, Agni Deepaka, Ama Pachaka* and *Srotoshuddhikara* are to be selected for administration in the patients of, Following is the List of different medications that can be given in Pituitary disorders considering the *Bala, Dosha* and *Dushya* involved in the patient.

Few examples of *Shamanoushadhis*

Churna

- *Pippali Churna*
- *Trikatu Churna*
- *Panchakola Churna*
- *Shaddharana Churna*
- *Panchasama Churna*

Vati

- *Kanchanara Guggulu*
- *Vyoshadi Guggulu*
- *Punarnava Mandura*
- *Triphala Guggulu*
- *Navaka Guggulu*
- *Amrutadi Guggulu*
- *Nityananda Rasa*

Asava-Arishta

- *Chitrakasava*
- *Pippalyasava*
- *Punarnavasa*

Kashaya

- *Hamsapadyadi Kashaya*
- *Varunadi Kashaya*
- *Asanadi Kashaya*
- *Punarnavadi Kashaya*
- *Dashamoola Kashaya*
- *Amruttotara Kashaya*

Rasayana

- *Pippali Rasayana*
- *Bhallataka Rasayana*
- *Chitraka Rasayana*
- *Lashuna Rasayana*
- *Shilajatu Rasayana*
- *Dashamoola Rasayana*
- *Shiva Gutika*
- *Amrita Bhallataka Lehya*
- *Madhusnuhi Rasayana*
- *Dashamoola Haritaki Rasayana*

Sneha

- *Varunadi Ghrita*
- *Guggulu Tiktaka Ghrita*
- *Panchatikta Guggulu Ghrita*
- *Mahatiktaka Ghrita*

CONCLUSION

- The hypothalamus–pituitary complex can be thought of as the "command centre" of the endocrine system. This complex secretes several hormones that directly produce responses in target tissues, as well as hormones that regulate the synthesis and secretion of hormones of other glands.
- In addition, the hypothalamus–pituitary complex coordinates the messages of the endocrine and

nervous systems. In many cases, a stimulus received by the nervous system must pass through the hypothalamus–pituitary complex to be translated into hormones that can initiate a response.

- In Ayurveda there is no clear cut evidence of Pituitary gland disorders, but on the basis of its clinical presentation, it can be correlated with different entities which one explained either as symptoms or diseases, so it is difficult to give a single Ayurvedic term for it. Acharya Charaka's Concept on *Astanindita Purusha* can be correlated to abnormal growth & development which is commonly seen in endocrinal disorders.
- It means that it is not possible to give the name to all the diseases. In this regard following points should be considered to diagnose it. As Charaka said, the same provoked humour, according to the diversity of causes and its localisation in different regions, produces many types of diseases.
- So Ayurveda gives guidelines regarding the management of un-named diseases on the basis of complete knowledge variation in its *Prakruti, Adhishtana and Samuthana, Vishesha, Dosha, Dushya, Srotas* involved, *Bala* of the *Vyadhi* and *Vyadhita* is more crucial for a *Vaidya.*
- Therefore, treatment should be initiated after diagnosing the nature of the disease, the different regions of localisation and the special causative factors rather than coining a term in Ayurvedic paralance.
- So we can consider any unnamed disease as *anukta vyadhi.*

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