International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Brief Study of Hypertrichosis

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ABSTRACT

Hypertrichosis, defined as excessive hair growth above the normal range for age, sex, and ethnicity, poses both cosmetic and psychological problems, especially in women and children. In contrast to hirsutism (androgen-induced male-pattern hair growth), hypertrichosis is abnormal proliferation of lanugo, vellus, or terminal hair and may be congenital or acquired. Congenital types, like hypertrichosis lanuginosa or Ambras syndrome, usually connect with genetic mutation, whereas developed cases might originate from drugs (e.g., minoxidil, phenytoin), metabolic disorders, or malignancy.

Diagnosis is based on clinical assessment, dermoscopy,and occasionally genetic analysis, particularly in syndromic presentations. Management is diverse drug-induced hypertrichosis can reverse on withdrawal of the causative drug, while irreversible methods such as laser or electrolysis are offered for long term control. In children, minimally invasive procedures (shaving, trimming) are utilized owing to sensitivity to pain. Novel topical drugs, including capryloyl glycine, have potential to decrease hair growth by inhibiting follicular activity. Although hypertrichosis is largely a cosmetic issue, in some cases it may indicate hidden systemic diseases that need a good medical evaluation. Successful treatment often involves a differential approach, weighed against patient tolerance, psychological welfare, and therapy effectiveness. Investigating the genotypic and molecular underpinnings through future studies promises to open additional targeted treatments of this fascinating cutaneous condition.

Keywords: Hypertrichosis, congenital, acquired, minoxidil, depilation, Ambras syndrome, laser treatment.

INTRODUCTION:

Hypertrichosis, which is defined as an excessive growth of hair (lanugo/vellus/terminal) on any part of the body above that found in people of the same race, age, and sex and excludes androgen-stimulated patterns of hair development, is one of the largest groups of aberrant patterning of hair growth. (1) It is frequently a cosmetic disorder, but in children, it rarely manifests as a stand-alone symptom for an extended length of time. Instead, it is linked to alterations in sexual function, somatic growth, or general metabolism, and it frequently forms a component of significant malformation syndromes. (2)

Congenital generalized hypertrichosis (which is further divided into congenital hypertrichosis lanuginosa, universal hypertrichosis, and hypertrichosis universalis congenita), prepubertal hypertrichosis, acquired generalized hypertrichosis, and acquired hypertrichosis lanuginosa are among the various forms of generalized hypertrichosis. Their clinical presentations and etiologies differ from one another. (3,4,5,6,7)

A particularly difficult disease in dermatology is hypertrichosis, a disorder of hair growth that exceeds the typical parameters of age, sex, and ethnic origin. (8) A remarkable correlation has been shown between the use of topical

minoxidil and low-dose oral minoxidil (LDOM), despite the fact that its pathophysiology involves a complex interplay of genetic predisposition, hormonal changes, and environmental determinants. (9)

Usually, areas with more hair, including the arms, back, and thorax, have thicker and denser hair. For some people, it is not pathological. However, the female case of hypertrichosis of arms is psychologically unsettling. A type of universal hypertrichosis affecting the hair, Ambras syndrome is characterized by uniformly distributed overgrowth of hair on the face and external ear, either with or without dysmorphic facial features. (10) Generalized facial hypertrichosis is another symptom that patients with gingival fibromatosis may exhibit.(11) Fetal alcohol and fetal hydentoin syndromes can result in congenital hypertrichosis. (12) In children and newborns who are otherwise healthy, prepubertal hypertrichosis is seen. involvement of the extremities, face, and back The back features an inverted fir-tree pattern for hair distribution. More frequently seen among descendants of South Asians and Mediterraneans.(13)

TYPES OF HYPERTRICHOSIS :-

According to Onset:-

Congenital hypertrichosis: Usually brought on by genetic mutations, this condition is present from birth.

Congenital hypertrichosis lanuginosa: The body is covered in fine, soft, unpigmented lanugo hair that persists over time.The excessive growth of thick, dark terminal hair throughout the body is known as congenital terminal hypertrichosis.

Acquired hypertrichosis: Occurs later in life and is frequently brought on by underlying illnesses or outside variables (such as drugs or cancer).

In accordance with Distribution

The term **"generalized hypertrichosis"** refers to excessive body hair growth. The term **localized (focal) hypertrichosis** refers to excessive hair growth in a specific location, such as the area around a scar or mole.

According to Hair Type:-

Lanugo hair: Congenital hypertrichosis lanuginosa is indicated by persistent growth of fine, nonpigmented hair that typically sheds after birth.

Vellus hair: Light-colored, soft, and fine hair; acquired hypertrichosis may cause excessive growth.

Terminal hair: Thick, coarse, pigmented hair; more noticeable and cosmetically problematic is the growth of terminal hair.

Unique Forms:_

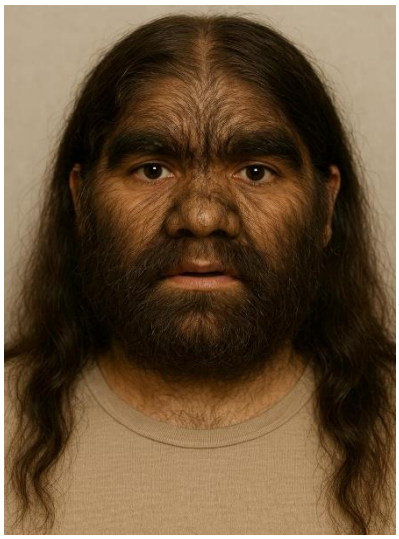
Nevoid Hypertrichosis: An area of profuse hair growth that resembles a birthmark. The term "hirsutism," sometimes confused with "hypertrichosis," describes the male-pattern hair growth that occurs in females and is typically brought on by hormonal abnormalities such as PCOS. (14,15,16,17,18,19)

Congenital hypertrichosis :-

Congenital hypertrichosis is an uncommon disorder characterized by excessive hair growth that normally starts at birth or shortly after, and is typically present from birth. The particular kind of congenital hypertrichosis known as congenital hypertrichosis lanuginosa (CHL) is distinguished by an overabundance of downy hair, or lanugo, covering the entire body except for the palms, soles, and mucous membranes. It is also associated with other congenital defects. There is also another term for the condition that is used to describe it: Downy Face Syndrome. It may coexist with other genetic abnormalities, indicating that this syndrome may cause a variety of bodily issues when present.

Although CHL exhibits a variety of symptoms, the disorder first manifests in childhood and is noticeable at a younger age when both the upper and lower body are covered in downy hair. The primary characteristic used to

describe congenital hypertrichosis and other congenital disorders is CHL, which also points to certain other characteristics that go beyond hypertrichosis.



(fig.1. Hypertrichosis)

Congenital hypertrichosis features are strongly associated with a name, which explains the unique case situation in question using the target traits that are in line with the aim. For instance, while discussing congenital hypertrichosis of the urge, Naevoid should go into great detail to explain why it is correct to categorize the condition as having characteristics that give chromosomal surrenders an imaginative foreground to a reality lie that suggests conquering. According to the chronology of events, hypertrichosis begins to develop into the world (grow into the body) as soon as it is born (after being born, and only after being born), and it continues to look like the north pole (completely shaven beard) as it reaches adulthood..

It's possible that all these notions are accurate inclusively valid when deemed true without falling into a gap of predefined conditions that come unlabelled and marked.(8,20,21)

Generalized hypertrichosis:-

Hypertrichosis is divided in various subgroups based on the age of onset (congenital or acquired), distributional extent (generalized or circumscribed) and location affected (elbow, neck, lumbosacral region) and whether isolated or found in association with other abnormalities. (30,31) Acquired generalized hypertrichosis can be secondary to various causes such as drug side effects, metabolic and endocrine disturbances (hypothyroidism), dermatomyositis, infectious diseases, malnutrition and anorexia nervosa, and ovarian and adrenal neoplasms. (32) Acquired circumscribed hypertrichosis can be secondary to local pressure, inflammatory lesions, improper use of cosmetics, and to hormonal or steroid stimulation of the skin. (33)

Localized hypertrichosis:-

Hair growth is a normal and intricate process. Any parameter like environmental or internal stimulation can influence nutrition and metabolism of hair growth. Particular, hair growth in any location that is more coarse, longer, or denser than the average standard based on age, sex and race, is considered as excessive. In the state of disorders, excessive or abnormal hair growth is known as hypertrichosis or hirsutism. (34,35) The acquired localized hypertrichosis (ALH) is a condition with abnormal vellus hairs without any androgen-induced hair in a localized region of the body. The ALH can cause chronic irritation, inflammation of the skin, friction and trauma. (36,37)

PATHOPHYSIOLOGY

The disorder known as hypertrichosis, which is unrelated to androgens (male hormones) like hirsutism, is characterized by excessive hair growth in non-hairy places. Either vellus (fine), terminal (thick), or even lanugo (the soft hair typically found on newborns) hair can be involved. In addition to developing as a side effect of certain drugs, this atypical hair growth may be a component of certain hereditary diseases.

Some drugs known to trigger hypertrichosis include:

- **Phenytoin** (used for seizures)
- **Minoxidil** (for hair growth and blood pressure)
- **Cyclosporine** (an immunosuppressant)
- **Corticosteroids, streptomycin, interferon, and others.**

Hypertrichosis may result from alterations in the hair development cycle, such as an increase in the number of hair follicles or more hairs entering the active (anagen) phase, in uncommon situations such as Ambras syndrome. But the precise cause is still unknown. Hirsutism, on the other hand, is the term used to describe the unique male-pattern hair growth that occurs in women, usually involving coarser, darker terminal hairs. traditionally tied to hormones, this can show up on the face, chest, or back—areas where males traditionally grow hair. Compared to hypertrichosis, hirsutism is much more common and can be acquired or congenital.

Some common culprits include:

- Polycystic ovary syndrome (PCOS)
- Idiopathic hirsutism (with no clear cause)
- Hormonal imbalances like hyperprolactinemia or Cushing's disease
- Certain tumors (ovarian or adrenal)
- Medications such as danazol or certain birth control pills

Occasionally, excessive hair growth is one of the first signs of a genetic syndrome, such as Sotos syndrome. Infants with Sotos may show signs like hypertrichosis lanuginosa (persistent soft hair growth) or loose skin (transient neonatal cutis laxa). As they grow, other features may emerge, like rapid growth in early childhood, learning challenges, and distinctive facial features including a long face, high forehead, and pointed chin. (22,23,24,25,26,27,28,29)

CAUSES

Congenital hypertrichosis can be inherited. It appears to be due to genes that trigger hair growth becoming abnormally active. In most individuals, the genes that led to extensive hair growth in humankind's very early ancestors are now dormant because humans do not need to be hairy to keep warm.

In individuals with congenital hypertrichosis, these genes become reactivated during pregnancy. There is still no recognized cause for this.

Acquired hypertrichosis, which occurs later in an individual's life, however, has various potential causes. Causes include:

Malnutrition

poor nutrition or specific eating disorders, e.g., anorexia nervosa

specific drugs and medications, e.g., hair growth medications, some immunosuppressants, and androgenic steroids cancer and cell mutation autoimmune and infectious diseases of the skin Occasionally, due to a condition known as porphyria cutanea tarda, the skin becomes very sensitive to UV light, and hypertrichosis can be caused.

If hypertrichosis is limited to particular areas of the body, it can be caused by chronic skin diseases, including lichen simplex, which is linked with recurrent rashes, itching, and scratching on an individual patch of skin. More blood

supply (vascularity) to one particular area of the body can also lead to the condition. At times, hypertrichosis-like symptoms develop in the region where a plaster cast was worn. (38,39,40,41,42,43)

SYMPTOMS

There are a number of subtypes of hypertrichosis that dictate how it appears and what can be done to treat it. Each is defined by a specific type of hair growth: lanugo, vellus, and terminal.

Lanugo is a fine, soft, light-colored hair layer that comes over a fetus while in the womb. Every newborn has lanugo. Lanugo can occur in adults in response to certain medical conditions. It's not quite as noticeable as with other hair growth.

Vellus hair is blonde, fine, and occurs on the cheeks and arms/legs of kids before thick, dark terminal hair appears.

Terminal hair growth is darker, thicker, and longer than the other three and is the kind that grows on your head. The androgen that is secreted during puberty converts vellus hair to terminal. Terminal hair growth is the most visible of the three types of hair growth.

The Structure and Function of Different Hair Types Individuals may be born with the condition or develop it later in life.

Congenital Hypertrichosis

There are three forms of hypertrichosis that an individual can be born with.

Congenital hypertrichosis lanuginosa: In this variation of the condition, this soft layer of hair during the fetus stage does not fade upon birth and instead, continues to grow.

Congenital hypertrichosis terminalis: This is the typical "werewolf syndrome" type of the condition in which an individual has abnormal and sometimes stark hair growth on large portions of their body. Unlike lanugo, the hair is usually dark and can be rather thick.

Nevoid hypertrichosis: This type may also appear later in life but is typically present at birth. It's a milder type of hypertrichosis where the excessive hair growth is confined to relatively small, discrete patches. One of the more familiar examples is a "unibrow."

Acquired Hypertrichosis

Some medical conditions can lead to acquired hypertrichosis. Depending on the underlying cause, this type can be quite mild or as bad as congenital types. An individual with acquired hypertrichosis may develop two types of hair growth: vellus or terminal.

Other Symptoms

People with hypertrichosis also have problems with their teeth. In addition to the aberrant patterns or volumes of hair growth that most people with the congenital type of the disorder have, you are more likely to have gingival hyperplasia, which causes enlarged gums that may bleed readily. Gingival hyperplasia and hypertrichosis at birth may cause delayed or non-erupted teeth in the baby. Sometimes referred to as Ambras syndrome or hypertrichosis universalis congenita, congenital hypertrichosis has been associated with various physical anomalies, such as dental issues. (44,45,46,47)

DIAGNOSIS

The diagnosis of hypertrichosis entails a thorough history of the beginning, progression, and pattern of hair growth as well as any associated symptoms or relevant medical history, such as drug usage or hormonal imbalances. The pattern, density, and kind of hair (vellus or terminal) on the affected areas are revealed by physical examination. (48) When the underlying cause of acquired hypertrichosis is resolved or the causative agent is removed, the diagnosis is made. The diameter, shape, and density of the hair shaft and follicular pattern are imaged by dermoscopy

(trichoscopy). (49) The diagnosis is supported by histological analysis of the hair shaft and roots. Terminal hypertrichosis is indicated by thicker, colored hairs, whereas lanugo hypertrichosis may be associated with a greater number of thin, elongated, faintly pigmented hairs. Punch biopsy of the hair follicle with histopathologic analysis may be necessary if the clinical appearance or dermoscopic examination is unclear or suggests the presence of inflammatory, endocrine, or genetic diseases. (50) Punch biopsy can show the type of hair (lanugo, vellus, or terminal), location of the hair follicle, and extent of follicular hyperplasia, perifollicular fibrosis, or dermal thickening that could be indicative of an underlying disorder.

molecular genetic testing

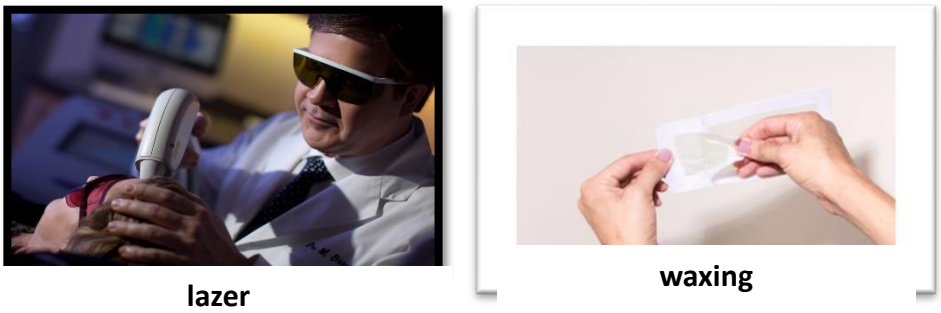
When suspicion for lanugo hair or CH arises, molecular genetic testing is the gold standard by which to perform testing for characteristic gene mutations. (8,51) Congenital hypertrichosis lanuginosa is caused by an inverted mutation on the 8q chromosome. Congenital hypertrichosis universalis results from a mutation in Xq24-q27. (21,8) Molecular genetic testing in a patient with Cantú syndrome will reveal a heterozygous pathogenic variant in ABCC9 or KCNJ8. (51)

TREATMENT

This review prioritizes evidence-based pharmacologic approaches in the optimal management of hypertrichosis by treating the underlying pathophysiology of abnormal hair growth. Besides pharmacologic management, other methods of hair removal are shaving, waxing, depilatories, electrolysis, and laser hair removal.

Medication induced hyertrichosis :- Before prescribing a medication, doctors ought to discuss hair growth as a potential side effect. When the offending substance is stopped, drug-induced hypertrichosis may be reversible and go away on its own. (48)

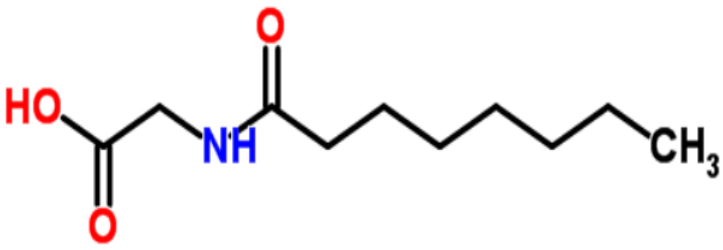
Hair removal methods :- Temporary and semi-permanent procedures are examples of alternatives to medical treatments. For undesirable hair, temporary fixes like shaving, waxing, and depilatories are frequently used. Although shaving works well, it might cause skin irritation if done frequently during the day. Also lazer technique of hair removal. (52)



(fig.2.hair removal methods)

Chemical cream techniques :-

A synthetic form of the lipid amino acid caprylic acid, capryloyl glycine (CG) is found in many over-the-counter medications and cosmetic products. One enzyme involved in hair cell concentration, migration, and proliferation is ornithine decarboxylase 1 (ODC1). ODC1 is frequently used to gauge hair growth since it is highly expressed during the anagen phase. By measuring its impact on ODC1 activity, two trials investigated the efficacy of a cream containing CG (4%) and soy-fermented glycine extract (1% soy isoflavonoids) in treating hypertrichosis. (53)



(fig.3. structure of capryloyl glycine)

Treatment in children :-

Age, maturity level, pain sensitivity, hair growth, and psychological needs will all be taken into consideration while choosing a treatment plan. Since painful hair removal methods are likely to cause discomfort and trauma when applied to youngsters, less invasive methods like shaving and trimming are recommended. Permanent hair removal techniques like electrolysis and laser hair removal have not been studied on youngsters who are about to enter puberty.(54)

Psychosocial Integration :-

Having hypertrichosis can have a major negative impact on one's emotional health. Unwanted attention is frequently drawn to the excessive hair growth, which can cause social isolation, low self-esteem, and humiliation. This emotional strain emphasizes how critical it is to treat the psychological as well as the physical symptoms of the illness.

It is crucial that the overall treatment strategy include mental health assistance. Frequent psychological evaluations can aid in the early detection of emotional difficulties such as sadness or anxiety. To learn how the condition impacts day-to-day functioning and mental health, instruments such as the Dermatology Life Quality Index (DLQI) or the Hospital Anxiety and Depression Scale (HADS) are helpful. A more sympathetic, comprehensive approach to care can be provided by medical professionals by recognizing and addressing the emotional aspect of hypertrichosis.

CONCLUSION

Hypertrichosis is a multifaceted dermatological disorder that presents with an excess of hair growth above the usual range for an individual's age, sex, and ethnicity. Hypertrichosis can be congenital or acquired, generalized or localized, and can involve lanugo, vellus, or terminal hair. Although usually a cosmetic issue, hypertrichosis can also represent underlying genetic, metabolic, or drug-induced conditions, especially in children. Diagnosis involves extensive clinical assessment, such as medical history, physical examination, dermoscopy, and, in a few instances, genetic analysis or biopsy. Management options depend on the etiology and extent of hypertrichosis. Cases due to drug intake resolve once the offending agent is discontinued, whereas congenital cases can necessitate long-term treatment. Both temporary removal techniques (shaving, waxing, depilatories) and permanent techniques (laser therapy, electrolysis) are frequently utilized, although patient tolerance to pain and patient age need to be taken into consideration, particularly in the pediatric population.More research at the genetic and molecular level is required to improve the understanding of the pathogenesis of hypertrichosis and to create more specific and efficient therapies. A multidisciplinary team including dermatologists, endocrinologists, and geneticists is necessary for the best patient care, especially in syndromic or hormone-induced cases. Early detection and personalized treatment can strongly enhance quality of life, particularly in patients with psychological and social issues related to excessive hair growth.

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