WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 9, Issue 9, 546-568. Review Article ISSN 2277– 7105

AHIPUTANA VIS-À-VIS DIAPER DERMATITIS: A REVIEW

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Article Received on
27 June 2020,

Revised on 17 July 2020,
Accepted on 06 August 2020,

DOI: 10.20959/wjpr20209-18404

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ABSTRACT

Diaper dermatitis or napkin rashes is a ubiquitous problem in the pediatric OPD. The condition is referred to as *Ahiputana, Gudakuttaka, Mathrukadosha, Prishtaru and Anamaka* in Ayurvedic classics. It is caused by improper care of infants and children requiring diapering and is also said to be caused by *stanyadushti* (vitiated breast milk). The disease is characterised by erythema, papules, pustules, ulcer, erosions, etc in the anal region. The condition has close resemblance with diaper dermatitis which encompasses irritant contact diaper dermatitis, candidial diaper dermatitis, perianal infectious dermatitis, etc and is comorbid with *atisara-grahani rogas, putana graha, ksheeralasaka, charmadala*, etc. The treatment involves avoidance of causes, *stanyasodhana* (purification of breast milk), applications like *tarkshyasaila*, decoctions for cleansing, powders for dusting, etc. as per the condition of the rash and *doshas* involved. A deeper knowledge of *ahiputana* and diaper dermatitis will definitely pave way for development of better management guidelines which can give considerable relief to the infants and their caregivers. Hence a thorough review of *ahiputana* and diaper dermatitis was done and presented in this article.

KEYWORDS: *Gudakuttaka, stanyadushti, ksheeralasaka, charmadala,* diaper-dermatitis, *tarksyasaila.*

INTRODUCTION

Diaper dermatitis or napkin rashes is a ubiquitous problem in the pediatric OPD. The references of diaper dermatitis in Ayurveda can be seen in Susruta samhita as *Ahiputana kshudraroga*[1] and in Ashtanga Hridaya by a variety of names like *Gudakuttaka, Mathrukadosha, Ahipoothana, Prishtaru and Anamaka* which describe the different traits of the disease.[2] A deeper knowledge of *ahiputana* and diaper dermatitis will definitely pave way for development of better management guidelines which can give considerable relief to

the infants and their caregivers. Hence a thorough review of *ahiputana* and diaper dermatitis was done and presented in this paper.

Etymology of *ahiputana* and its synonyms

An understanding of the synonyms will throw light upon the nature of the disease and its finer details.

1. *Ahiputana*[3] in Sanskrit means 'sores on the hinder part of the body'. Acharya Indu has related the disease *ahiputana* to '*putana-graha'* (diarrhoeal disease associated with sepsis in infants).
2. *Gudakuttaka* means 'that which cuts the anal region.'(*kuttana*=cut).[4]
3. *Mathrukadosha* means 'a defect which has maternal cause' or 'that which comes from the mother'; (*matruka*[5] = maternal or coming from or belonging to the mother; *dosha*[6] = disorder or defect). This indicates that the disease is either due to improper care from the mother or due to vitiated breast milk which are said to cause the disease.
4. *Prishtaru* means *arus*[7] or 'sore' in *prishta*[8] or 'back'.
5. *Anamaka*[9] means 'anonymous', 'nameless' or 'infamous.' The term is also used to denote piles or hemorrhoids which is also called by the name '*durnama'*(meaning 'notorious' or 'having a bad name').

Etiopathology of *ahiputana*[10][11]

The causes of *ahiputana* are:

1. Lack of cleansing of the diaper area of the infant soon after passage of stools and urine. This is due to neglect of mother and the disease therefore gets the name *matrukadosha.*
2. Infrequent bathing of the infant who sweats a lot.
3. Vitiated breast milk (as per Gayadasa and Bhoja).[12]
4. *Putana-graha: Ahiputana* is associated with *putana-graha* which is an infectious diarrhoeal disease explained among *graharogas* (sepsis).[13] Indu explains the term *pouthana* as '*putanakhya dosha janitam'*[14], giving the name *ahiputana.* The association of the term *ahiputana* with *putana-graha* indicates its comorbidity with diarrhoeal diseases.
5. Tender skin of the infant which is prone to easy damage makes it vulnerable to diseases like *charmadala* and *ahiputana*. While describing the disease called *charmadala* (disease comparable with atopic dermatitis) in children, Acharya Kasyapa has explained that the skin of the infant is tender and is easily damaged by clothing, warm climate, sweating,

contact with feces and urine and lack of cleansing thereafter, rubbing with powders, etc.[15]

*Dosha*s and *dushya*s involved in *ahiputana*[16][17]

Ahiputana is caused by vitiated *rakta* (blood) and *kapha-dosha* as per Susruta and Vagbhata. Dalhana in Nibandhasangraha says '*ahiputanam kapha-raktajam jneyam*.' While describing the management of *ahiputana*, Vagbhata has considered the involvement of *kapha* and *pitta dosha*s in the mother and child as causing the disease and has advised treatments pacifying *kapha* and *pitta* for breastfeeding mother. *Pitta vrana chikitsa* (management of pitta predominant wounds/ulcers) and *raktamoksha* (bloodletting) indicate the importance of *pitta* and *rakta* in *ahiputana*. The *dhatu* involved is *twak* (skin) which represents *rasa* (first *dhatu* or tissue formed after digestion). The involvement of *mala*s- *sakrit*, *mutra* and *sweda* is not only due to *upalepa* or smearing on perianal region but also due to vitiation especially of *sakrit* (faeces) caused by *kapha-pitta* vitiated breast milk and *putana-graha*.

Pathogenesis of *ahiputana*[18][19]

Due to lack of proper cleansing of anal region after passage of stools and lack of bathing of a sweating child, smearing of urine, faeces and sweat over anal region occurs and *utkleda*[20] (wetting or moistening) by *sweda* and *mala* occurs which cause *rakta* and *kapha* vitiation of the skin. Itching develops in the anal region from vitiation of *rakta* (vitiated blood) and *kapha* dosha. Due to vititation of *dosha*, primarily *kandu* or pruritus of perianal skin occurs. *Kanduyana* or scratching results in ulceration and quick eruption of *sphota/pitaka* (papules and pustules) along with *srava* (discharge). The eruptions lead to ulceration or wounds which blend or coalesce to form a horrible and dreadful large rash which is called *ahiputana*. It is also said to be *ghora* or severe with *bhuri-upadrava* (numerous complications).

Gayadasa has described it as being opposite to *sanniruddha-guda* (anal stricture) as it is described after *sanniruddha-guda* by Susruta in *kshudraroga-nidana*. *(Sanniruddha-guda vipareeto ayam, vranai: saha ekibhavena gudasya ativivrutatwat).*[21] Due to coalescing of ulcers to form a large *vrana* and due to frequent stooling in diarrhoea, there is gaping of *guda* (anal opening) due to ulceration and inflammation and therefore *ahiputana* is considered as being opposite to *sanniruddha-guda* in which there is stricture of the anus.

Clinical features of *Ahiputana*[22][23][24] (Table No. 1)-

Table No. 1: Clinical features of *Ahiputana*.

Signs and symptoms-
Kandu (pruritus in and around *guda* or anal region)/ *kanduyana* (intense itching)
Daha (burning sensation)
Ruja (pain)
Tamra-vrana (coppery coloured ulcer)
Sphota/pitaka (papule/pustule)
Srava (discharge)
Ekibhutavrana (coalesced ulcer), *ghora* (horrible looking)
Bhuri upadrava (associated with many complications like *jwara* or fever, etc.)

Types[25]

Specific types of *ahiputana* are not mentioned by Vagbhata and Susruta, but Bhoja's opinion of '*yathadosham sudarunam*'[26] points to categorization of *ahiputana* based on the *doshas* involved and its severity. This indicates the involvement of all *dosha*s and the necessity to understand the presence of each dosha and treat accordingly. According to the *dosha* which appears predominant in the disease, it may be considered as *kapha* predominant, *pitta* predominant, *vata* predominant or *dwidosha* (two *dosha*s) or *sannipatika* (three *dosha*s). The severity also may vary according to *dosha* involved- *pitta* causing acute and severe inflammation, *kapha* causing intense pruritus and chronic inflammation, *vata* causing severe pain, etc.

Comorbid conditions and differential diagnosis[27]

Ahiputana may be comorbid with *atisara* (diarrhea) and *putana graha* (diarrhoeal disease associated with sepsis), *grahani roga* (malabsorption syndromes), *kushta* (skin diseases), *charmadala* (atopic dermatitis or eczema in children), *ksheeralasaka* (disease comparable with cow's milk allergy or infectious diarrhea), etc which should be differentiated by careful history taking and diagnosis.

Management of *Ahiputana*[28][29]

1. Purification of breast milk

Stanyasodhana (purification of breast milk) is mentioned as the first step of treatment of *ahiputana*. Drugs pacifying *pitta* and *kapha doshas* are recommended for this purpose. Susruta has stated that the *ahiputana* in infant becomes curable or *sadhya* only when the breast milk is purified. A medicated ghee prepared from *patolapatra, triphala* and *rasanjana* for *pana* or intake which when drunk cures even the *krichrasadhyaahiputana* (*ahiputana*

which is very difficult to be cured). Dalhana explains here that the ghee mentioned is for the *sodhana* (purification) of *dhatri* (breastfeeding mother). This ghee may also be used for application on *vrana* when it becomes *suddha* (free of *doshas*) after *kshalana* (washing).

Administration of *stanya-sodhana* drugs not only purifies breast milk but, by this, breast milk also acts as a vehicle for carrying drug to the breastfed child. Through this, purification of *rasa* (first *dhatu* derived from digestion of food) and *stanya* (upadhatu of rasa) occurs in *dhatri* and purification of *rasa* occurs in the infant which leads to a healthy skin.

2. Decoctions for intake

Vagbhata has mentioned a cooling drink prepared from boiled and cooled water for the mother to be taken frequently for pacification of *pitta*. This may also be given to a partially breast-fed child or weaned child for *pitta* pacification. Commentators Indu and Chandra have opined that, the drink is to be prepared with *sitaseeta*[30] (*swetachandana* or sandalwood) which may be used for preparing *panaka* for cooling. Ashtanga Sangraha mentions the use of *tarkshya antarapanaka* for *anamaka, sthoulya, pittasra, kandu, gandagalamaya, udaraatyunnati*, etc.[31]

The drug *tarkshyasaila* is mentioned in *navanagana* (drugs for nasal instillation) where it is mentioned as *sushka* (dry) *rasanjana* (*daruharidra leha*) by Indu.[32] While describing *tarkshyasaila* in *ahiputana* treatment, Indu has mentioned it as *makshika rasanjana yoga*[33] (combination of *swarnamakshika*-pyrites and *rasanjana*-Berberis aristata). While *sritaseeta antarapanaka* cures pitta, *makshika rasanjana yoga* with honey cures the aggravated *kapha*, as per Indu.[34] *Makshika* and *rasanjana* can be used internally and externally.

3. External applications

Various external applications like *lepa*s, powders for dusting and decoctions for washing are mentioned which have to be chosen according to the condition of the ulcer. Washing with decoctions are preferred when there is *srava* (discharge) where dusting may be counterproductive. Dusting may be suitable in *suddha-vrana* which is devoid of *doshas*. The principles of *vranachikitsa* especially of *pitta vrana* is applicable in the management of *ahiputana*.

- *Swetachandana* is advised to be used with honey and *tarkshyasaila* for external application on the ulcer by Indu.

- Susruta has mentioned *badaritwaklepa* with *saindhava* and *amla* (kanchika etc.). The use of *amla* or acidic medium for application of drugs helps to regain the pH balance of the skin of the diaper area. *Kshalana* or washing with *triphala badari plakshatwak kashaya* or *triphala* alone may be done in severely oozing or *kapha pitta* predominant ulcers. This decoction is used for healing the ulcers (*vranaropana*).
- *Kaseesa, gorochana, tutha, manohwa, haritala* and *rasanjana* powdered and mixed with *amlakanchika* may be used for *lepa* or may be used as powder for dusting. This powder has strong antiseptic and antimicrobial properties. Dalhana explains that *amlakanchika* can be used for mixing *kaseesa*, etc for external application.
- *Yashtimadhu* and *sankhachurna* or *asanatwakchurna* may be used for application and dusting.
- *Kapalatuthaja churna* for *avachurnana* (dusting) may also be done. *Kapalachurna* mixed with *tuthachurna* or copper sulphate powder may be incinerated and used for dusting. Dalhana explains that *kapala* is *pakwamritbhandakhanda* or pieces of earthen vessels. It contains red ochre or *gairika* which is *kaphapittasamana* and *vranaropana*. *Tutha* or copper sulphate is antiseptic and antimicrobial.
- In severe redness and itching, *raktasrava* (bloodletting) is advised. Infant being tender, *jalouka avacharana* (leech therapy) is advised. *Jalouka* does not cause pain or complications related to *raktasrava* in infants. This reiterates the involvement of *raktadushti* in infant causing *ahiputana*.
- All *pittavranahara* treatments can also be judiciously applied for treating *ahiputana* in infants. *Panchavalkala taila, jatyadighrita* or *kera, kaseesadi taila, durvadi ghrita, sathadhouta ghrita, murivenna, panchavalkalakashaya, triphala kashaya*, etc can be applied considering *dosha* and *avastha* of the *vrana*. *Pradeha, parisheka, sarpipana, virechana* etc are mentioned by Charaka in *pittavrana chikitsa*.
- All *pathyas* of a *vrana* patient should be followed by the mother and infant. Light food like *manda, peya, vilepi, simbidhanya, saka, ghrita*, etc is *pathya*.[35]

AHIPUTANA VIS-À-VIS DIAPER DERMATITIS

Ahiputana is equivalent to napkin rashes or diaper dermatitis. The following conditions are frequently diagnosed as diaper dermatitis in infants and children.

- Irritant contact diaper dermatitis
- Candidial diaper dermatitis

- Perianal candidiasis
- Perianal dermatitis or perianal streptococcal disease
- Perianal infectious dermatitis

What is Diaper Dermatitis?

Diaper dermatitis is a general term which is used to indicate the inflammatory skin eruptions of the diaper area in infants due to prolonged contact with irritants like urine, faeces, sweat, moisture, etc due to diaper use.[36] Secondary microbial infections may also supervene.[37] Even though not life threatening, the disease can be severely distressing for the infant and caregivers. It is the most common skin disease in infants wearing diapers. Studies report a prevalence varying from 7 to 35% percent.[38] The condition is more common in children under 24 months of age, beginning in neonatal period when wearing diapers start, with peak incidence in the 9-12-month age group. After 24 months, toilet training is usually established which reduces its incidence.[39][40] It is self-limiting, being transient for about a day and resolves without treatment or may be moderate in majority of the cases. But it is severe and recurrent in about 7 per cent of the cases who come to the OPD for management.[41] Cow's milk allergy was also found to be a major etiologic factor for the development of perianal dermatitis in children.[42]

Classification of rashes in diaper area

Diaper dermatitis is a geographic diagnosis. The condition can be broadly classified into 2-

1. Primary diaper dermatitis, which is an acute inflammation of skin in the diaper area with ill-defined and multi-factorial etiology, and
2. Secondary diaper dermatitis, which encompasses all eruptions in the diaper area with defined etiologies.[43]

A conceptual classification of diaper dermatitis into three categories[44] is as follows:

Category 1: Rashes developing from the use of diapers- including irritant contact dermatitis, candidial diaper dermatitis, miliaria, intertrigo, and granuloma gluteale infantum. These are true diaper dermatitis.

Category 2: Rashes that usually appear in other areas but get exaggerated in groin area due to irritating effect of diapers- including atopic dermatitis, seborrheic dermatitis and psoriasis.

Category 3: Rashes appearing in diaper area irrespective of diaper use- includes- bullous impetigo, Langerhan cell histiocytosis, acrodermatitis enteropathica, congenital syphilis, scabies and HIV.

Category 1 can be treated by changes in diapering practices alone. Catergories 2 and 3 are not cured by changes in diapering practices alone and appear in areas other than diaper area.

Most eruptions of the diaper area are secondary to an irritant contact dermatitis. Candidial diaper dermatitis is the most common diaper dermatitis which is a prototypical example of irritant contact dermatitis. Chronic inflammation and ulceration lead to secondary infections also. Severe and recurrent cases should be investigated for zinc deficiency and Langerhans cell histiocytosis.[45]

Skin peculiarities in infants[46]

The skin of infants and children are different from that of adults in that it is smoother and softer, due to a thin stratum corneum. The water handling in infant skin is different and the natural moisturizing factor and lipid production in skin are also lesser. Due to these factors the skin in infants is easily affected by irritants and inflammation. Therefore skin diseases like diaper dermatitis and atopic dermatitis are common in children and not in adults.

Irritant contact diaper dermatitis

Irritant contact diaper dermatitis is the most common form of diaper dermatitis or napkin rash with/ without candidial diaper dermatitis. It occurs as a reaction to over-hydration of skin, friction, maceration, and prolonged contact with urine and feces, retained diaper soaps and topical preparations. Stool pH in breastfed infants is lower than that in formula-fed infants and therefore there is lesser incidence of diaper dermatitis in breastfed infants. Normal pH of the skin is acidic (between 4.5 and 5.5) which maintains the normal flora of the skin to protect it from bacteria and fungi. It is also called ‘ammoniacal dermatitis’ due to damage of skin from ammonia formed during pathogenesis. But recent studies demonstrate that ammonia plays no apparent role in the generation of diaper dermatitis.[47]

Skin barrier dysfunction in diaper dermatitis may lead to later atopic dermatitis than other skin problems in infancy. Thus, diaper dermatitis can be considered as an early sign of congenital skin vulnerability which may be related to atopic dermatitis.[48]

Etiopathology of irritant contact dermatitis in diaper area[49] [50] [51] [52] [53] [54] [55] [56] [57] [58] (Table No. 2) (Fig. No.1)

Diaper dermatitis has a multi-factorial etiology and no one factor alone causes dermatitis.

Table No. 2: Etiopathological factors of Irritant contact diaper dermatitis.

Peculiarities of diaper area-
Difficulty in cleansing and drying due to folds and creases Occlusion, perspiration and frequent contact with faeces and urine make the area moist and humid
Diapering practices-
Infrequent changing of diapers Mixing of urine and faeces Prolonged wetness Friction of with diaper Not giving diaper free time Improper cleansing Use of harsh soaps
Mixing of urine and faeces-
Bacillus ammoniagenes in faeces act on urea in urine to form ammonia which increases the pH of the area from 5.5 to 6.8-7.15. Urine also increases permeability of skin to irritants and irritate skin when exposure is prolonged.
Faecal factor-
Digestive enzymes in faeces like proteases, lipases and ureases, bile salts and microbes activated by higher pH act as irritants. Enzymes damage skin by proteolysis of filaggrin in stratum corneum. Bile salts potentiate the damage produced by fecal enzymes.
Diarrhoea/malabsorption-
Frequent contact with feces Fecal lipase and protease activity increased by acceleration of gastrointestinal transit. Deficiency of zinc and other minerals.
Microbes-
Higher pH stimulates growth of candida, staphylococci, streptococci, E. coli, etc Increase inflammation and skin damage.

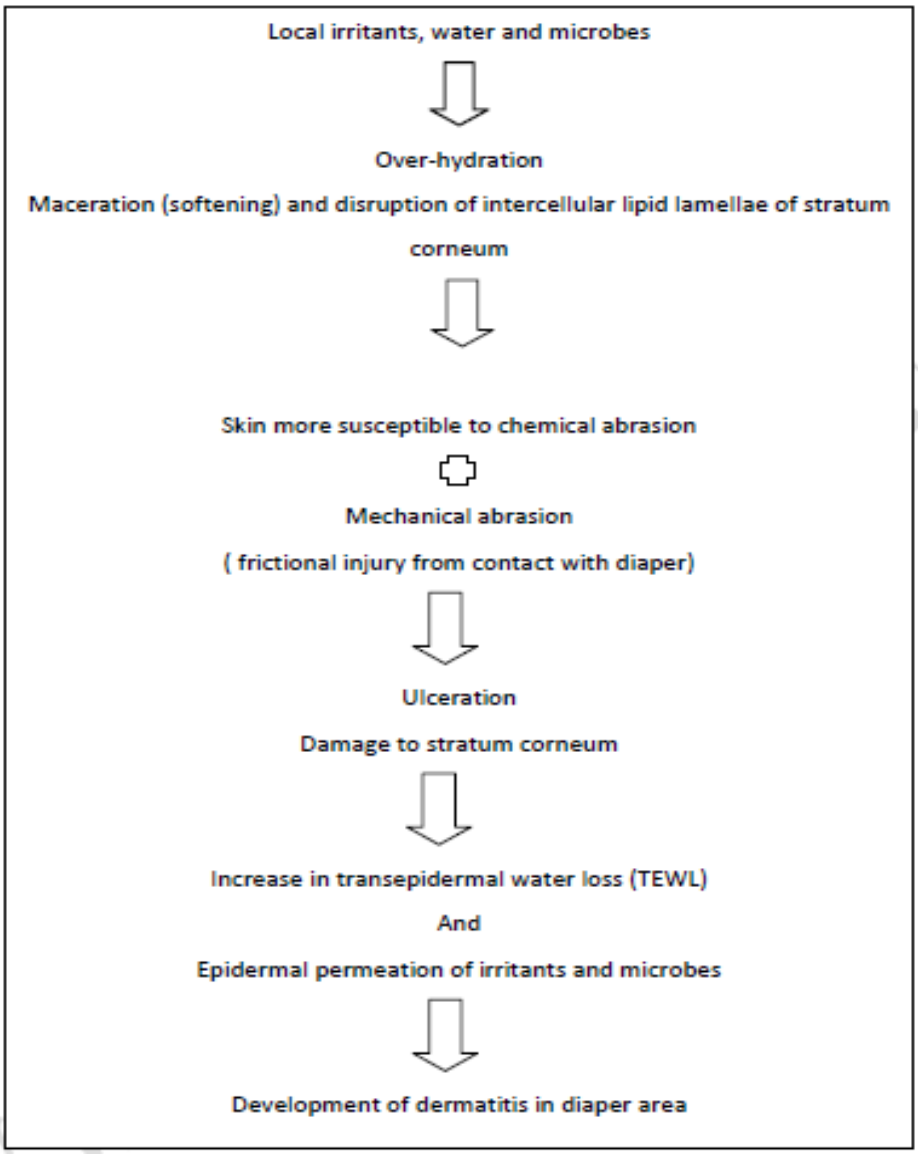

Fig. No. 1. Pathogenesis of Irritant contact diaper dermatitis.

Clinical features[59][60]

Diaper rash predominantly affects the convex surfaces in closest contact with wet or soiled diapers. Skin becomes erythematous and scaly with papulovesicular or bullous lesions, fissures and erosions. Eruptions occur in patches or become confluent. There is marked discomfort due to intense inflammation. Secondary bacterial or fungal infections may occur. Intertriginal areas are spared. Buttocks, genitalia, lower abdomen and upper thighs are severely affected. In chronic forms, scaling with glazed erythema may be seen. Scaling is noticeable especially in healing stages. Behavioural changes such as increased crying and agitation and changes in eating and sleeping patterns indicate emotional distress.[61]

Types and grades of ICDD[62]

Irritant contact diaper dermatitis is of four grades.

Grade 1- mild erythema with or without scaling.

Grade 2- moderate to severe erythema with or without scaling, with few papules and some edema.

Grade 3- moderate to severe erythema with or without scaling, moderate to severe edema and papules or early ulceration.

Grade 4- severe erythema with or without scaling, severe edema, papules and ulceration.

Complications of diaper dermatitis

Granuloma gluteale infantum and Jacquet's erosive dermatitis are severe variants of irritant contact diaper dermatitis.

- Granuloma gluteale infantum[63]: there are numerous, violaceous or reddish-brown papules and nodules of varying sizes located on the convexities and running parallel to the skin folds. Chronic contact dermatitis, topical corticosteroids, bromide ointments, candida infection, prolonged use of benzocaine, occlusion from diapers, etc. are considered as causes. The diagnosis should be considered in longstanding and unresponsive cases of diaper dermatitis.[64]
- Jacquet's erosive diaper dermatitis is characterized by well-demarcated erosions and punched-out ulcers with elevated margins.[65] The causes include urinary incontinence, diarrhea, and infrequent diaper changes.

Candidial diaper dermatitis

Candida is the most common secondary infection in diaper dermatitis occurring in more than 80% of the cases. *Candida albicans* should be considered present in any diaper dermatitis known to be present for longer than three days.[66] *Candidial* diaper dermatitis is characterized by intense erythema, confluent plaque with scalloped border and sharply demarcated edges, formed by confluence of numerous papules and vesiculo-pustules and satellite pustules. Satellite pustules are the hall mark of candidial infections. Perianal skin, inguinal folds, perineum and lower abdomen may be involved. Erosion and ulceration can occur in severe cases.[67] Gastrointestinal colonization of candida in mothers and infants lead to severe dermatitis where candida has a primary role in causing dermatitis.[68] Retention of stools and urine due to infrequent diaper changes is the primary cause as candida is a microbe in stools. It can occur as secondary infection to preexisting skin diseases like atopic

dermatitis, seborrheic dermatitis and irritant contact dermatitis. It also follows antibiotic and steroid therapies.

Peri-anal candidiasis is similar to candidial diaper dermatitis, but occurs only perianally due to skin irritation and superinfection with candida. Apart from other causes similar to irritant contact diaper dermatitis, anal fissures and pin worm infestations may also result in perianal candidiasis.

Perianal streptococcal disease/infection

Perianal bacterial infection by *streptococcus* is characterized by well demarcated perianal erythema (pink to beefy red) up to 2cm from anus. The lesions are very tender and may fissure and bleed. There may be involvement of genitals and anal pruritus, painful defecation and blood streaked stools.

Perianal infectious dermatitis

Perianal infectious dermatitis is mostly caused by perianal *Staphylococcus aureus* infection and is common in male babies. It is known to have a familial spread by bathing together. It is marked by dermatitis, pruritis, and superficial erythematous well marginated rash. It is bright red, moist & tender and a white pseudomembrane may also be present. In chronic forms there may be fissures, mucoid discharge, psoriatiform plaques with yellow peripheral crust. Genitals may be involved and there may be rectal pain, blood streaked stools and fecal retention.

Management of diaper dermatitis[69]

Conditions that arise from diaper wearing like irritant contact dermatitis, miliaria, and intertrigo can be treated by changing diapering practices.

Diapering practices

The diaper area should be kept dry and time given for aeration along with frequent change of diapers. Recommendations of diaper changes are based on frequency of urination in infants that is, change every 3-4 hours, totally 6-8 times a day. This reduces prolonged contact with urine and faeces which has damaging effect on skin.[70] Night changes of diapers should be of minimum three times. Studies show that increasing diaper changes during night is more important when compared to day changes.[71] Loose diapers may be worn. Disposable diapers with superabsorbent material and breathing diapers may be used.

Cleansing

Diaper area should be cleansed gently with lukewarm water after changing diapers. Soap is not recommended but if necessary mild soaps without fragrance may be used. Plain water is preferred to baby wipes. Wipes without fragrance and preservatives may be used in unavoidable circumstances but excessive scrubbing should be avoided.

Skin care

Proper skin care in infants by oiling and application of barrier agents protect the skin from irritants and is necessary in infants. But oiling can be counterproductive if Candida supervene.[72] Appropriate skin care can help to prevent the occurrence of diaper dermatitis and to speed up the healing of affected skin.[73] Diaper creams and emollients are found to be more effective than talcum powder which is thought to keep skin dry. It can cause respiratory allergies and alveolar damage.[74] Corticosteroids have the risk of systemic absorption, atrophy of skin and delay in growth.[75] Zinc-oxide pastes though are effective barriers are found to be difficult to wash off for removal and aggressive cleansing is found to be irritating. Topical fluorinated glucocorticosteroids, boric acid, and mercury-containing preparations should be avoided in the diaper area because of their toxicity.[76] Barrier preparations provide a lipid film over the surface of the skin and/or provide lipids that can penetrate into the stratum corneum, simulating the effects of normal intercellular lipids. In candidial dermatitis also frequent diaper changes and diaper free period are advised along with antifungal ointment. Herbal medicines like *Aloe vera*, *Calendula* are found to have antimicrobial effects and heal diaper rashes.[77] Zinc supplements are recommended in zinc deficiency. In the case of granuloma gluteale infantum, recovery takes several months, but is complete with proper management.

Differential diagnoses of irritant contact diaper dermatitis include[78] [79] [80] [81] [82]

Diagnosis of diaper dermatitis is based largely on physical examination. A careful history is needed to exclude other differential diagnosis.

- Miliaria or prickly heat

Miliaria occurs from occlusion of eccrine glands by diaper use and may be seen also on face, neck, axilla, etc.

- Intertrigo

Intertrigo occurs in skin creases due to friction of wet skin causing maceration and abrasion in the diaper area especially in inguinal area, natal cleft, folds of thighs, etc.

- Atopic Dermatitis

Atopic dermatitis is common on face especially malar area, trunk and extremities and diaper area is usually spared being moist. Family history of atopy is common. Irritant contact dermatitis and allergic contact dermatitis can occur in diaper area in infants with atopic dermatitis.

- Allergic Contact Diaper Dermatitis

Allergic contact dermatitis is uncommon in the diaper area. The allergy is typically to the rubber components found in the elastic sidebands and dyes in diapers. It affects the lateral buttocks and hips when sidebands are involved and convex areas of diaper area when dyes are involved similar to irritant diaper dermatitis.

- Seborrheic dermatitis

Infantile seborrheic dermatitis is characterized by erythematous papules and plaques with greasy, yellow scale on the scalp (cradle cap), eyebrows, nasolabial folds, retroauricular areas, trunk, flexures, intertriginous areas, and diaper area.

- Napkin psoriasis

Psoriasis is uncommon in infants. But when present is common in diaper area due to irritation from the diaper, urine, and feces. Often there is a family history of psoriasis. Scalp, retroauricular area and nails may also be involved.

- Langerhans cell histiocytosis

It is a life threatening condition which is characterized by severe hemorrhagic diaper dermatitis which does not respond to treatment. It is similar to seborrheic dermatitis affecting the folds, genitalia and perianal region also along with other systemic involvement like hepatosplenomegaly, lymphadenopathy, anemia, etc. Diagnosis is via skin biopsy.

- Zinc Deficiency and acrodermatitis enteropathica

There are well demarcated erythematous plaques which develop into vesiculobullous and pustular lesions in perineal, perioral and acral areas. There may be failure to thrive, diarrhea,

alopecia, etc. Hereditary zinc deficiency disorder called acrodermatitis enteropathica and other causes of zinc deficiency as in malabsorption syndromes, prematurity, low levels in maternal milk; etc may be etiologic factors.

- Scabies

Papules, vesicles, burrows, nodules, excoriations etc may be found with generalized distribution. History of contact may be present.

- Human immunodeficiency virus

HIV may present as diaper rash with severe erosions and ulcerations in perineal area and gluteal cleft.

- Congenital syphilis

In syphilis, papulosquamous, reddish-brown erosive or bullous lesions are observed in the diaper area with other signs of syphilis.

- Kawasaki Disease

The rash first involves the diaper area, where it presents as an erythematous, desquamating eruption.

Laboratory studies[83]

If febrile, complete blood count for suspected secondary bacterial infection.

Lab tests may be done to find anemia, zinc deficiency, serology for syphilis, etc. to exclude differential diagnosis.

Culture and gramstaining of swabs from bullae, pustules, etc. may be done.

Potassium hydroxide (KOH) scrapings may be taken for candidiasis.

Skin biopsy is done if granuloma gluteale infantum and Langerhans cell histiocytosis are suspected.

RESULTS AND DISCUSSION

Ahiputana is a disease comparable with diaper dermatitis which includes irritant contact diaper dermatitis, candidial diaper dermatitis, perianal candidiasis, perianal streptococcal disease, perianal infectious dermatitis and other conditions like miliaria, intertrigo and granuloma gluteale infantum.

Avoidance of causes of vititation of breast milk, following the diet and regimen of lactating mothers[84] and avoiding the specific causes of *ahiputana*, in the form of cleansing immediately after passing urine and stools and frequent changing of diapers, can help in curing and preventing the occurance and recurrence of diaper dermatitis. Any comorbid conditions like *atisara-grahani roga* (diarrhea and malabsorption), *ksheeralasaka* (disease comparable with cow's milk allergy), *charmadala* (atopic dermatitis), etc. should be carefully diagnosed and properly managed.

Candidial dermatitis may be considered as being *kapha pitta* predominant. Gut colonization in mother needs proper management in the form of purificatory and pacificatory therapies. Any diaper dermatitis which is not cured by avoidance of causes alone and last for more than three days should be considered as being superinfected with candida and appropriate purificatory techniques done in mother and treatments adopted in breastfed child. After six months of age, internal medications may be given to the child but purificatory methods are avoided.

Perianal infections especially streptococcal dermatitis is *pitta* predominant and may require *pittahara vrana chikitsa* and *jalouka avacharana* in refractory cases.

Complications like granuloma gluteale infantum and Jacquet's erosive diaper dermatitis also may also be managed with utmost care using *stanyasodhana*, decoctions, dusting powders, and appropriate use of *vranahara tailas* and *ghritas* and *jalouka avacharana*. Understanding conditions of *doshas* in each case will help in selecting drugs and modes of application of treatment procedures.

The general treatment mentioned for *ahiputana* including *stanyasodhana*, *lepas* like *tarkshyasaila*, *swetachandana*, *kaseesadi churna*, *kapalatuthaja churna*, *sariba sankhanabhi churna*, *asanatwak churna*, *badaritwak kshalana*, *jalouka avacharana*, etc are underutilized in the Kaumarabhritya OPD and may be judiciously advised in different forms of diaper dermatitis. *Lepas* are advised to be applied in *amlakanchika* etc. which helps to regain the normal acidic pH of the infant skin which is lost in diaper dermatitis. Pinworm infestations and other *krimi rogas* also need to be managed with *krimihara* treatments if comorbid with diaper dermatitis.

Numerous medicated oils are advised by Ayurveda for general skin care of infants like *Eladi kera, Nalpamaradi taila, Lakshadi taila, Bala taila*, etc. which can be used daily before or after bath which helps to protect the tender skin of infants and prevents diseases like *ahiputana*. Ayurveda also advises the use of *churnas* like *aswagandha, mudgadi, eladi*, etc. in the place of soaps for bathing the child which helps to preserve the normal skin pH in infants. The use of water boiled with *ksheeritwak, nimbapatra, usheera, tulasipatra*, etc. may be used lukewarm for bathing the infant.

Improved hygiene, frequent diaper changes, use of superabsorbent disposable diapers, avoidance of over-washing, short periods without diapers, management of candida, etc are required in dermatitis of diaper area along with application of emollients and protective anti-infective agents.

CONCLUSION

Ahiputana is comparable with Diaper Dermatitis which is caused by improper diapering practices, superinfections, and improper skin care of the infants. Understanding the causes, pathogenesis, management and differential diagnoses of ahiputana vis-à-vis diaper dermatitis definitely will help the Kaumarabhrityakas to put into practice the different treatment options available for *ahiputana* in various forms of diaper dermatitis.

AKNOWLEDGEMENTS

I express my gratitude to the Assistant Director In-charge of my institute Dr. Rajesh Sannd for the inspirational guidance, and my colleagues Dr.Vineeta Kumari Negi, Dr. Vikas Nariyal, Dr. Kavita Vyas and Dr. Anubha Chandla for their enthusiastic support in finishing this work.

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