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Review Article

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AN OVER VIEW ON KSHUDRA KUSHTA

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ABSTRACT

Kushta is the broad spectrum word used in ayurveda to describe all the skin disease under one heading i.e. classified into Mahakushta (7 Major) and Kshudra Kushta (11 Minor) Skin is the largest protective organ of body between external and internal environment. The causative factors includes Virudha Ahara (Intake of contradictory food and drinks), vegadharana (Suppression on natural urges) Manasika vikaras (Psychological problems). The disease Kushta is characterized by discoloration of skin, loss of touch sensation, appearance of rashes, excessive or no perspiration.

KEYWORDS: Kshudra Kushta, Kushta, Skin, Skin disorder, Ayurveda.

INTRODUCTION

Skin is the largest protective organ of the body between external environment and internal environment. It is a mirror that reflects physiological, pathological, metabolic condition of the body and help in diagnosis of disease. Charaka Samhita of Ayurveda which describes skin disorder under classification called Kushta of which Kshudra Kushta is one among them consists of 11 in number. The Aetiology of Kushta explained in classics like Virudha Ahara (Intake of contradictory food and drinks), vegadharana (Suppression on natural urges) Manasika vikaras (psychological problems) etc. [1]

In *Ayurveda* the disease which manifest in the seven layers of *Twak* are considered as *Twak Roga* which involve *Twak*, *rakta*, *mamsa*, *lasika*. In Charaka samhitha, Kushta (skin disorder).

Kshudra Kushta (11 Types)

Eka Kushta

Charmakhya

Kitiba

Vaipadika

Alasaka

Dadru

Charmadala

Paama

Visphota

Shataru

Vicharchika

There is no clear explanation for the division but commentators tried to explain the difference between the Maha kushta and Kshudra kushta. According to chakrapani Kshudra kushta is having alpa dosha, lakshana, when compared with Maha kushta hence named as Kshudra Kushta.

The detailed explanations of Kshudra Kushta as follows,

Eka kushta

It shows symptoms like Asweda (Absence of sweating around lesion), Mahavastu (Lesion are spread over large area of skin) Matsya Shakala upamam (Resumbles like skin of fish) it is Vata- Kapha Dominance^[4] this can be compared with the following disease.

Ichthyosis Vulgaris is also called as fish scale disease, that develops on the extremities, especially on the extensor surfaces. On the lower limbs, the scales are usually larger with an adherent center and detached outwards. Mild hyper-keratosis of palms and soles i.e. common leading to skin markings. In severe conditions scaling extends to larger area of trunk, scalp, forehead and cheeks. Clinical symptoms and severity depends on seasons, in summer and humid season it subsides where as in dry and cold seasons it worsens. It is caused by heterozygous loss of function of filaggrin gene in the body. Plaque Psoriasis also called as psoriasis vulgaris. On examination there will be white or brownish white inflamed lesion oval in shape, well defined and sharply restricted boundaries, dry, thin, silvery white scales.^[5]

Charmakhya

It is Vata-kapha dominance symptoms like Bahalam (Affected part will be thick) Hasti charmavat (Resumbles like elephant skin)^[6] it can be compared with following diseases Scleroderma is an chronic, autoimmune connective tissue disorder that is characterized by thickening and hardening of skin and other tissue. Symptoms including tight skin, dry and itchy skin, blackish or whitish (pepper and salt resemblance) in color.

Lichen Simplex Chronicus are characterized as hyper pigmented, lichenified, leathery plaques that result from habitual scratching and rubbing of the skin. The disposing factors include Xerosis and Atrophy. The plaques are usually well circumscribed. It is an itching chronic dermatosis which is acquired in origin with evolving circumscribed lesions on sites prone to mechanical trauma such as rubbing and scratching etc. Iatrogenic activity plays major role in the perpetuation and induction of the condition.^[7]

Kitiba kushta

The Signs and symptoms are Shyavam (Blackish brown discoloration of the skin), Khinakharasparsha (Affected skin will be rough to touch like the scar tissue), Parusha (It is hard to touch) the doshas involved is Vata Kapha, [8] It can be compared to psoriasis (Guttate). It is characterized by sharply demarcated and *erythematous*, *papulosquamous* lesion less often, nearly all the body surface is involved, or numerous small, widely disseminated papules and plaques are seen. Occasionally there are obvious microscopic pustules, as in generalized pustulosis. From the clinical perspective, Psoriasis can be regarded as a spectrum of different cutaneous manifestations. Sometimes different variants may co-exist in a particular individual, but the skin lesions all share the same hall marks, erythema, thickening and scale. Psoriatic lesions are classically very well circumscribed, circular red papules or plaques with grey or silvery white dry scale. The lesions are distributed symmetrically on scalp, elbow, knees, lumbo-sacral area and in folds of body. Trauma or injury may induce psoriasis which is called Kobner's phenomenon. Nail and joint involvement is distinct in chronic cases of psoriasis. [9]

Vipadika

The doshas involved is Vata Kapha, signs and symptoms will be Panipadasputanam (Cracks in the palms and soles of feet), Tivravedana (Excruciating pain).^[10] It can be compared to cracked feet or Palmoplantar Psoriasis and Palmar Plantar Pustules. It is hard growth of skin on the outer edge of the heel, yellow or dark skin on the heel. Pain increases in thin soles or

open back shoes while walking, Red or flaky patches on the heel of the foot, peeling and cracked itchy skin. On examination it looks like red or white cracks.

Alasaka kushta

The Signs and symptoms being Gandi (Boils on the skin), kandu (Itching) and raga (redness) The doshas involved is Vata Kapha,. It can be compared to *Prurigo nodularis*. It is a skin condition characterized by the presence of multiple nodules and papules that the central scale crust and are often due to intense pruritus. It occurs in all age groups, but primarily afflicts adults, especially middle-aged women. The lesions of *Prurigo nodularis* are characterized as hard dome-shaped Papules or nodules with central scale-crust. The colour varies from brown to skin coloured. Multiple excoriations, post inflammatory hyper pigmentation and superficial scarring are also often seen. *Prurigo nodularis* is a chronic disorder characterized by papulo-nodular pruriginous eruption of an unknown aetiology. A variety of systemic conditions like hyper thyroidism, hepatic failure, renal failure may be associated with this disease. The mechanism by which these disorders trigger *prurigo nodularis* is unknown. [12]

Dadru kushta

The doshas involved is Kapha pitta, signs and symptoms being Kandu (itching), raga (redness) pidaka (itching sensation and redness with papules). Mandala (circular patches with elevated edges). [13] It can be compared to *Tinea* infection. *Tinea* is the name of a group of disease caused by filamentous fungus (Dermatophytes). They are caused by three genera of fungi thry are Microsporum, Trichophyton and Epidermophyton have the unique ability to invade and multiply within keratinized tissue. (Hair, Skin, Nails). The fungi, collectively called "dermatophytes" are alike in their physiology, morphology and pathogenicity. 'Tinea' precedes the Latin name for the involved site Eg: Tinea corporis is a dermatophyte infection of the skin of the trunk and extremities excluding the hair, nails, palms, soles and groin. Infection spreads centrifugally from the point of skin invasion, with central clearing of the fungus, typically resulting in annular lesions of varying sizes. Tenia infections are classified according to the affected body site, Such Tinea captis (scalp), Tinea barbe (beard area), Tinea corporis (skin other than beard area, scalp, groin, hands or feet), Tinea cruris (groin, perineum areas), Tinea pedis (Feet), Tinea Mannum(Hands) and Tinea ungum (nails)^[14] on examination it looks like circular erythamatous lesion centrally not effected by symptoms (clear skin)

Charmadala

The doshas involved is Kapha pitta, signs and symptoms will be Rakta (redness), Kandu (itching sensation), sphota (pustules) over the body, rugdalati (blisters burst), Ruja (painful pustules) and Samsparshasahamuchyathe (tenderness over the pustules), daha (burning sensation). Charmadala can be compared to impetigo, Herpes, herpengia. It is common, highly contagious, superficial skin infection that primarily affects children. The condition presents in both non-bullous and bullous forms. The primary pathogens in non-bullous and bullous impetigo are *staphylococcus aureus* and less commonly group A β – *hemolytic streptococcus*. [17]

Non-bullous impetigo: Early manifestation: Single 2-4mm *erythematous macule* that rapidly evolves into a short lived *vesicle* or *pustule*. Late manifestation: Superficial erosion with a typical honey coloured yellow crust and rapid direct extension of infection to surrounding skin. Distributed on face and extremities may or may not associate with mild *lymphedenopathy*. Non bullous impetigo begins with a single *erythematous macule* that rapidly evolves into a vesicle or pustule and ruptures, the released serous contents later dries, leaving a crusted exudate over the erosion. Rapid spread follows by continuous extension or to distal areas through inoculation of other wounds from scratching.

Bullous-impetigo: Early manifestation: Small vesicles enlarge into 1-2 cm superficial bullae. Late manifestation: Flaccid, transparent bullae measuring up to 5 cm in diameter with a collarets of scale, distributed on face, trunk, buttocks, perineum and extremities. Bullous impetigo usually consists of small or large, superficial, fragile bullae, often these quickly appear, spontaneously rupture, and drain so that only the remnants, or collarets, are seen at the time of presentation. [18]

Paama

They are characterized by eruptions which are white, reddish or blackish brown in colour. The doshas involved is Kapha pitta. The condition is prevailed with intense itching. Paama can be compared with scabies. It is a worldwide problem in all ages, races and socioeconomic groups are susceptible. Higher incidents occur with overcrowding, economic depression and in refugee camps. Scabies can be transmitted directly by close personal contact, sexual or indirectly via fomite transmission. The highly host specific eight-legged mite *sarcoptes scabiei* causes human scabies. Mites from animals are not a source of human infestation. Intense pruritus classically is accentuated at night and is exacerbated by a hot

bath or shower. Localization of the pruritic papules in patients with scabies is classically in the webs of the fingers, flexor aspects of the wrists, extensor aspects of the elbows, periumbilical skin, buttocks, ankles, penis in males and the peri-areolar region in females.^[20]

Sphota (or) Visphota

The doshas involved is Kapha pitta, signs and symptoms are sphota (Several eruptions which are either white or reddish in appearance). Tanutwak (Eruptions are specifically thin walled). Sphota can be compared to superficial folliculitis and chicken pox. It is a very common disorder characterized by peri-follicular pustules. Culture of pustular contents often fails to identify a bacterial pathogen, but of the infectious aetiologies, *staphylococcus aureus* is the most common pathogen. Perifollicular pustules usually arise on an erythematous base and the pustules may be pierced by a hair. Slight itching and burning sensation may accompany, the scalp and extremities are common sites of involvement. Pseudofolliculitis results from beard or body hairs that become ingrown and is seen in individuals with highly curved and tough hairs. The resultant pustular eruption is not primarily an infection, but rather a foreign body inflammatory reaction. On examination there will be vesicles filled with fluid, well defined circular multiple lesions.

Sataru

The doshas involved is Kapha and pitta, signs and symptoms includes multiple ulcerated patches which are red or blackish brown in colour. The patches are associated with burning sensation and pain. [23] Sataru can be compared to *pyoderma gangrenosum*. It is an uncommon chronic, recurrent cutaneous ulcerative disease with a distinctive morphologic presentation. It can occur at any age but most commonly afflicts women between 20 to 50 years of age. Fifty percent of patients have underlying systemic diseases such as inflammatory bowel disease, arthritis or myloproliferative disorders. Although the disease is idiopathic in 25-50% of patients, an underlying immunologic abnormality is currently forwarded, given its frequent association with systemic diseases that have a suspected autoimmune pathogenesis. The classic morphological clinical presentation is an ulcer. There are several variants with different clinical presentation. The number of ulcers varies from one to one dozen and sometimes they coalesce. *Pyoderma gangrenosum* is a primarily sterile inflammatory neutrophilic dermatosis. It is characterized by recurrent cutaneous ulcerations with mucopurulent or hemorrhagic exudate. These are very painful with undermined bluish borders and surrounding erythema. It occurs most commonly on pre-tibial area and has been

reported on other sites of the body including breast, hand, trunk, head and neck, and peristomal skin. Extracutaneous manifestations include involvement of upper airway mucosa, eye, genital mucosa, sterile pulmonary neutrophilic infiltrates or spleen infiltrates, and neutrophilic myositis. [24]

Vicharchika

The doshas involved is Kapha, signs and symptoms are Bahusraava (excessive discharge of eruptions) Shyavapidaka (eruptions are blackish brown and associated with itching sensation). [25] Vicharchika can be compared to Eczema in particular stasis dermatitis (weeping Eczema). Eczema (or) Dermatitis, is a reaction pattern that presents with variable clinical and histological findings and is the final common expression for a number of disorders, including atopic dermatitis, allergic contact dermatitis, dyshidrotic eczema, nummular eczema, stasis dermatitis, Seborrheic dermatitis etc. Stasis dermatitis develops on the lower extremities secondary to venous incompetence and chronic oedema. Early findings in stasis dermatitis include mild erythema and scaling associated with pruritus. The typical initial site of involvement is the medial aspect of the ankle, often over a distended vein. As the disorder progresses, the dermatitis progressively pigmented, due to chronic erythrocyte extravasations leading to cutaneous haemosiderin deposition. At time stasis dermatitis becomes acutely inflamed with crusting and exudates. Involved skin in stasis dermatitis may exhibit changes seen in other eczematous conditions. Severe, acute inflammation may result in exudative, weeping patches and plaques. Underlying fat necrosis (lipodermatosclerosis) may be exquisitely painful; these cases of deep, acute inflammation may be difficult to differentiate from cellulitis or erythema nodosum. In fact, stasis dermatitis is the most frequent condition for which patients are misdiagnosed as cellulitis. [27-29]

DISCUSSION

In **Eka kushta**, vata kapha doshas are involved. Dryness attributes to vata whereas scaling to kapha. In Ichthyosis Vulgaris scaling of the body occurs extensively as described in Eka Kushta as "Mahavasthu", "Mathsyasakulo pamam", Eka Kushta is better compared with Ichthyosis vulgaris.

The Thickness of skin in the Charmakhya kushta is attributed to Kapha whereas the dryness attributes to vata. Lichen simplex chronicus is characterized by lichenified, leathery flakes which is compared to "Hasthi Charma" of Charma kushta.

The shyavavarna, parushatva, Khinakharasparsha is attributed to Vata dosha whereas kandu is due to kapha dosha in **kitiba kushta.** The erythema can be compared to shyama varna, parushatva, Khina khara sparsha is alike to thickening of psoriasis.

The Hard Growth on the outer part of skin is **Vipadika** kushta attributes to vata kapha dosha, cracks in palm, soles and excruciating pain of vipadika clinical compared with Cracked feet or Palmo-plantar Psoriasis.

The Nodular growth of **Alasaka** is attributed to vata and Kandu (Itching) is attributed to Kapha. The Nodular growths, intense itching and redness of Alasaka can be better matched with clinical manifestations of Prurigo *Nodularis*.

The itching sensation is attributed to Kapha Dosha, papules and erythema is attributed to pitta dosha in **dadru**. The clinical features resemble to that of Tinea infections such as itching, circular elevated patches and erythema.

In **Charmadala** itching sensation and pustules are attributed to kapha dosha whereas redness, tenderness is attributed to pitta dosha. The symptoms like pustules, erythema is alike both in charmadala and impetigo.

The reddish eruptions are attributed to pitta dosha and kandu to the kapha dosha in **paama**. The symptoms like intense itching, erythematous papules of Paama and scabies.

In **visphota** the reddish pustules attribute to pitta dosha whereas pruritis is attributed to kapha. The reddish pustules which are thin walled are the clinical manifestations found common in visphota and superficial folliculitis And chicken pox.

The burning sensation of the ulcerated patches and redness is attributed to pitta dosha whereas extensiveness of ulcer is guarded by kapha in **sataru**. The clinical manifestations of sataru are multiple ulcerated patches which are same as that of *Pyoderma gangrenosum*.

The exudates, itching sensation are attributed to Kapha dosha in **vicharchika**. The symptoms of vicharchika include excessive exudation with blackish brown eruptions which resemble the signs and symptoms of Stasis dermatitis (weeping Eczema).

Kushta is a broad term described by Charaka for various skin manifestations. The probable basis of classification of Kushta into Maha and Kshudra Kushta on the severity and

chronicity of the disease that are more pronounced in Maha Kushtas. It is also known that the occurrence of Maha Kushtas is more than the Kshudra Kushtas. Though Kshudra Kushta are described to be minor skin diseases having less symptomatology some skin manifestations like Sataru (*Pyoderma Gangrinosum*) have grievous pathology. Some of the skin disorders described in Kshudra Kushtas are secondary skin manifestations like eczema and *pyoderma gangrinosum*.

These all sign and symptoms helps in diagnosing the skin disorders.

Kshudra Kushta according to the charaka Samhitha and the Modern Corelation

S. No.	Name of Kshudra Kushta	Modern Correlation
1	Eka Kushta	Ichthyosis Vulgaris, Plaque Psoriasis
2	Charmakhya Kushta	Lichen Simplex Chronicus, Scleroderma, Filariasis
3	Kitiba Kushta	Psoriasis (Guttate), Actinic keratosis
4	Vipadika Kushta	Palmar-Plantar Psoriasis, Palmar-Plantar Pustules, Palmar Plantar Eczema
5.	Alaska Kushta	Prurigo Nodularis
6	Dadru Kushta	Tinea Infection
7	Charmadala Kushta	Impetigo, Herpes Simplex, Herpes Zoster, Herpengia
8	Paama Kushta	Scabies
9	Visphota Kushta	Folliculitis, Chicken-Pox, Pemphigus Vulgaris, Pemphigus foliaceus
10	Sataru Kushta	Pyoderma gangrenosum, Arterial and Venous Ulcers
11	Vicharchika Kushta	Eczema, Atopic Dermatitis



Fig. 1: Eka Kushta.



Fig. 2: Charmakhya Kushta.



Fig. 3: Kitiba Kushta.



Fig. 4: Vipadika Kushta.



Fig. 5: Alasaka Kushta.



Fig. 6: Dadru Kushta.



Fig. 7: Charmadala Kushta.



Fig. 8: Paama Kushta.



Fig. 9: Visphota Kushta.



Fig. 10: Sataru Kushta.



Fig. 11: Vicharchika Kushta.

REFERENCES

- Talekar Manisha, Mandal Sisir Kumar, Sharma Reetu. Role of viruddha ahara in kustha (skin disease): An epidemiological study. Int. J. Res. Ayurveda Pharm, 2015; 6(3): 335-341. http://dx.doi.org/10.7897/2277-4343. 06366
- 2. Acharya Agnivesa, Charaka samhitha, edited by Sharma RK, Bhagawan D, Choukamba Sanskrit series, Varanasi, Nidana sthana, Chakrapani commentary on, 2002; 5,4: 68-69.
- 3. Acharya Sushrutha, Sushrutha samhita, edited by Sharma PV, Chaukhamba orientalia, Varanasi, Nidanasthana, Dalhana commentary on, 2007; 5: 495.
- 4. Acharya Agnivesa, Charaka samhitha, edited by Sharma RK, Bhagawan D, Choukamba Sanskrit series, Varanasi, Chikitsa sthana, on, 2000; 7,21: 325.
- 5. Jaean LB, Joseph LJ, Ronald PR, Deramatology, First Edition, Mosby elsiver, Spain, section, 9: 57.
- 6. Acharya Agnivesa, Charaka samhitha, edited by Sharma RK, Bhagawan D, Choukamba Sanskrit series, Varanasi, Chikitsa sthana, on, 2000; 7,21: 325.
- 7. Katambas AD, Lotti TM, Dessinoti C, Angelo M, European hand book of dermatological treatments, Thirdedition, Springer Heidelberg international, Newyork, 2015; 44: 431-434. https://books.google.co.in/books
- 8. Acharya Agnivesa, Charaka samhitha, edited by Sharma RK, Bhagawan D, Choukamba Sanskrit series, Varanasi, Chikitsa sthana, on, 2000; 7,22: 325.
- 9. RGB Langely, GG Kruger, CEM Griffin, Psoriasis Epidemology, Clinical features and quality of life, Annuals of rheumatic diseases, 2005; 64: 18-23.
- 10. Acharya Agnivesa, Charaka samhitha, edited by Sharma RK, Bhagawan D, Choukamba Sanskrit series Varanasi, Chikitsa Sthana, 2000; 7,22: 325.
- 11. Acharya Agnivesa, Charaka samhitha, edited by Sharma RK, Bhagawan D, Choukamba Sanskrit series, Varanasi, Chikitsa sthana, on, 2000; 7,23: 325.

- 12. Micheal.R, Stephen.S, Prurigo nodularis a review, Australian journal of Dermatology, 2005; 46(4): 211-20. available from http://www.mediskin.cn http://dx.doi.org/10.1111/j.1440-0960.2005.00187.x
- 13. Acharya Agnivesa, Charaka samhitha, edited by Sharma RK, Bhagawan D, Choukamba Sanskrit series, Varanasi, Chikitsa sthana, on, 2000; 7,23: 325.
- 14. Saral Noble, Robert C Forbes, Pamela L Stamm, Diagnosis and management of common tinea infections, July, American family physician, 1998; 58(1): 163-174. http://www.aafp.org/afp/1998/0701
- 15. Acharya Agnivesa, Charaka samhitha, edited by Sharma RK, Bhagawan D, Choukamba Sanskrit series, Varanasi, Chikitsa sthana, on, 2000; 7,24: 326.
- Moran GJ, Amii RN, Abrahamian FM, Talan DA. Methicillin-resistant *Staphylococcus aureus* in community- acquired skin infections. Emerg Infect Dis, 2005; 11(6): 928-930. http://dx.doi.org/10.3201/eid1106.040641
- 17. Kuniyuki S, Nakano K, Maekawa N, Suzuki S. Topical antibiotic treatment of impetigo with tetracycline. J Dermatol, 2005; 32(10): 788-792. http://dx.doi.org/10.1111/j.1346-8138.2005.tb00846.x
- 18. Lisa. s lewis, Russel w steele. Impetigo clinical presentation, 2014. http:// emedicine. medscape.com / article/965254-overview
- 19. Acharya Agnivesa, Charaka samhitha, edited by Sharma RK, Bhagawan D, Choukamba Sanskrit series, Varanasi, Chikitsa sthana, on, 2000; 7,25: 326.
- 20. Shelly F Walton, Bart J Currie. Problems in diagnosing scabies, A global disease in human and animal populations, Clinical microbiology reviews, 2007; 20(2): 268-279. http://dx.doi.org/10.1128/CMR.00042-06
- 21. Acharya Agnivesa, Charaka samhitha, edited by Sharma RK, Bhagawan D, Choukamba Sanskrit series, Varanasi, Chikitsa sthana, on, 2000; 7,25: 326.
- 22. Thappa D M. Text book of Dermatology venerology and Leprology, Third edition, Elsevier, India, 2009; 6: 48. https://books.google.co.in
- 23. Acharya Agnivesa, Charaka samhitha, edited by Sharma RK, Bhagawan D, Choukamba Sanskrit series, Varanasi, Chikitsa sthana, on, 2000; 7,26: 326.
- 24. Uwe wollina. Pyoderma gagrinosum-a review, Orphanet journal of rare diseases, April, 2007; 2: 19. http://www.ojrd.com/content/2/1/19http://dx.doi.org/ 10.1186/1750-1172-2-19
- 25. Acharya Agnivesa, Charaka samhitha, edited by Sharma RK, Bhagawan D, Choukamba Sanskrit series, Varanasi, Chikitsa sthana, on, 2000; 7,26: 326.

- 26. Mahamad Yunus S., R. K. Hibare, V. S. Kotrannavar, Mohasin. Kadegaon, Rashmi V. Efficacy of Arkapatra taila and Aragvadadi kwatha in the management of Vicharchika with special reference to Eczema. Int. J. Res. Ayurveda Pharm, 2014; 5(4): 444-446 http://dx.doi.org/10.7897/2277- 4343.05491
- 27. Huang TM, Lee JY. Lipodermatosclerosis a clinicopathologic study of 17 cases and differential diagnosis from erythema nodosum. J Cutan Pathol, 2009; 36(4): 453-60. http://dx.doi.org/10.1111/j.1600-0560.2008.01049.x
- 28. David CV, Chira S, Eells SJ, Ladrigan M, Papier A, Miller LG. Diagnostic accuracy in patients admitted to hospitals with cellulitis. Dermatol Online J. March, 2011; 17(3): 1.
- 29. Keller EC, Tomecki KJ, Chadi Alraies M. Distinguishing cellulitis from its mimics. Cleve Clin J Med, 2012; 79(8): 547-552. http://dx.doi.org/10.3949/ccjm.79a.11121