Ten top tips: intertrigo/intertriginous dermatitis

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Intertrigo or intertriginous dermatitis is an inflammatory condition of skin folds, induced or aggravated by heat, moisture, maceration, friction and lack of air circulation. Intertrigo's Latin translation, inter (between) and terere (to rub) helps explain the pathophysiology of the condition.

1 **Skin folds and joints have elevated risk for intertrigo**. Flexural surfaces and skin folds have a higher surface temperature compared to other body parts. The moisture and sweat build-up that gets trapped in these areas adds to the maceration of the stratum corneum and epidermis. Additionally, the integumentary system houses bacteria and yeast that flourish in this environment and overgrow in these conditions, making infection a common finding.

2 **Presentations vary in severity and can be acute or chronic.** Intertriginous dermatitis generally has an insidious onset with symptoms such as itching, pain, burning or prickling sensations in skin fold areas. Initially, it presents itself as mildly erythematous papillae or plaques, quickly developing into an exudative erosion, fissures, macerations and crusts. Erythema due to secondary infections, increased inflammation, papullo-pustules and bad odour may develop.

3 **Examine skin folds thoroughly.** Any skin fold may be involved with intertrigo. Lesions mostly develop in the neck, axilla, sub-mammary fold and perineum, while other sites may also be involved, including antecubital, umbilical, perianal and interdigital areas, as well as abdominal folds, eyelids and behind the ears. In adults or infants who are obese, skin folds are accentuated, and inflammation may occur under pendulous breasts, abdominal folds, in neck creases, or in popliteal or antecubital fossae. The skin fold must be opened until the entire skin can be inspected. In morbidly obese patients, this examination will often require additional people to hold the skin folds up and apart. Some patients can assist with holding the skin fold also *[Figure 1]*.

4 **Not all patients with intertriginous dermatitis are obese**. Patients with spinal cord injury can sweat from autonomic dysreflexia, and that sweating is above the level of injury. However, excessive sweating occurs throughout the body also. I have seen quadriplegic patients with dermatitis of the buttocks, when there is no other form of moisture than their sweat. The best treatment is to turn the patient more often when in bed and use athletic shorts/pants to facilitate moisture management.

5 **People with diabetes have an elevated risk for Candidial infections throughout the body.** People with diabetes mellitus (DM) also have a higher risk for candidial skin fold issues because their elevated glucose levels in the sweat which serves as an energy source for the organism. Examine people with diabetes closely, candidial infections are common in the mouth (thrush), feet and vagina. *Candida* species isolated from patients with DM have a higher pathogenic potential for biofilm formation. When these infections become systemic, they are difficult to treat (Rodrigues et al, 2019).

6 **Consider several possible causes of skin breakdown within a skin fold.** Skin fold inflammation and breakdown can be with irritant or allergic contact dermatitis, seborrheic dermatitis, pemphigus, atopic dermatitis, scabies, metabolic diseases and metastatic malignancies. When the skin breakdown is in the toe web spaces consider mycotic infections. When the perineum is involved, ask about a history of incontinence or the use of containment products that do not remove urine or stool from the skin. The axilla can breakdown from allergic contact dermatitis with some deodorants, so ask if the patient has recently changed soap or deodorant. Wide spectrum antibiotics may also lead to *Candida* colonisation and pathogenicity by disrupting the saprophytic flora of the skin and mucosal membranes. A detailed history of medication should be obtained to avoid unnecessary use of antibiotics and corticosteroids.

7 **More than *Candida albicans* can be present in intertrigo.** *C. albicans* is a part of the normal flora in skin and genital and/or intestinal mucosa in healthy individuals. Similar to many other opportunistic microorganisms of the skin, it exists as a commensal yeast in individuals with an intact immune system (Tüzün et al, 2015). While, *Candida* species thrive in heated, high-moisture environments and are a common offender of

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Figure 1. Skin examination often requires additional help.

Figure 2. Candidiasis evident as satellite lesions.

secondary infection in cases of intertrigo. Satellite lesions outside of the injured skin is a classic presentation *[Figure 2]*. Moreover, patients with DM have increased pH levels in intertriginous areas contributing to their demographic prevalence. However, do not automatically order antifungal products for skin fold problems. Myself and colleagues cultured skin folds on admission to the hospital to determine what role a contaminated skin fold might have in hospital-acquired and post-surgical infections. Several forms of Gram-negative organisms were found in axillary and breast skin folds. *Staphylococcal* species (coagulase negative) was the most common organism and proteus was the second most common organism (Edwards, et al, 2006) *[Figure 3]*.

8 Order topical treatments considering the pathophysiology of intertriginous dermatitis. Intertrigo develops from frictional forces when two skin folds rub together. In obese patients or areas of redundant skin, air cannot circulate in the area and dry the skin. So, the skin sweats and macerates. When opposing skin surfaces rub against each other, erosions occur and become inflamed. Faeces, urine and vaginal discharge may aggravate intertrigo in both adults and infants.

Keeping the skin fold dry can be a challenge in bed bound patients. In hospitalised patients, it has been common to fold linen and put it in the skin fold *[Figure 4]*, but this practice does not dry the fold because the linen just absorbs and holds the sweat. Fabrics that wick sweat away should be used, such as athletic fabric or commercial fabrics. The fabric should be laid in the fold with an edge exposed to the environment. Small skin folds can be held apart with pieces of foam dressings. When the patient is turned to the side, the skin fold should be opened and held open with pillows or towels so that air can reach it (Black et al, 2011).

Antifungal powders can be used, but should be 'dusted' onto the skin, not applied so thickly that the power cakes and has to be pulled off the skin.

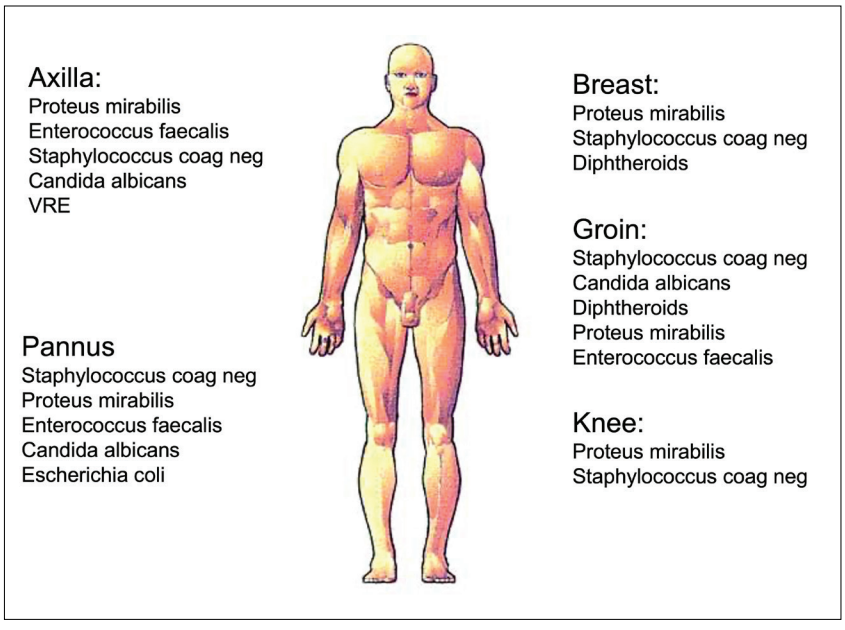

Figure 3. Results of skin cultures taken on admission to the hospital.

9 Recognise the potential virulence of *C. albicans*. The fungus *C. albicans* is a member of the normal human microbiome. In most individuals, *C. albicans* resides as a lifelong, harmless organism. Its growth is kept under control by the other organisms in the biome. Under certain circumstances, however, *C. albicans* can cause infections that range from superficial infections of the skin to life-threatening systemic infections. Those circumstances include loss of balance in the biome, especially with the use of broad-spectrum antibiotics, trauma to the gastrointestinal mucous, pH over 7 and very warm body environments. Superficial *C.*

Figure 4. Linen placed in a skin fold does not dry the skin fold.

albicans infections are non-lethal. In stark contrast, systemic candidiasis is associated with a high crude mortality rate, even with first-line antifungal therapy (Mayer et al, 2013; Metin et al, 2018).

10 **Cellulitis and secondary infections can develop.** Since the open skin fissures are frequently is colonised or secondarily infected, secondary cutaneous infections and acute cellulitis are threats to occur. Considering the findings in the skin fold cultures, the practitioner should be aware that secondary cutaneous infections can be caused by a variety of Gram-positive or Gram-negative bacteria or fungi, including yeasts. An infectious intertrigo may result in serious cellulitis, especially in patients who have diabetes. Additionally, skin fissuring and ulceration can occur, possibly hidden in the deep skin folds of persons who are obese, which can lead to pain, disability and, potentially, sepsis (Pfaller and Diekema, 2007).

Conclusion

Intertriginous dermatitis is a common finding. While it may appear to be a relatively easy skin disease to treat, do not assume that topical antifungals will fix the problem. The skin fold needs to be kept dry and education for the patient on what fabrics to wear is important. WINT

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