Psoriasis

Plaque psoriasis is a chronic inflammatory disease with an unknown cause and no cure. Much research is based on the theory that psoriasis is a T cell mediated disorder. This review suggests that the pathogenesis of psoriasis fits the general picture of a type IV hypersensitivity reaction. Orthodox and herbal approaches to treatment are both shown to be more beneficial if they are tailored to the individual and address psychosocial issues.

Psoriasis is a chronic, inflammatory, non-contagious, skin disease affecting over 2% of the population world-wide. Many different forms of psoriasis exist including: guttate, flexural, scalp, erythrodermic, pustular, palmar/pedal, and psoriatic arthropathy. This review focuses on the most common form - chronic plaque psoriasis.

The exact cause of psoriasis is as yet unknown. Several factors have been identified which may contribute as triggers. The aim is of this review is to focus on chronic plaque psoriasis and the immunological and inflammatory mechanisms behind it. Although most sources recognise a familial link in psoriasis, the complex genetics will not be discussed except where necessary. The historical background, epidemiology, aetiology, pathogenesis, pathology, clinical features, diagnosis, and treatment of psoriasis will be reviewed.

Background

'Psoriasis' stems from the Greek 'psora' meaning 'itch' and 'iasis' meaning 'a condition'. It was first used either by Galen (Pusey, cited in van de Kerkhof, 1999, p3), or by Celsus (Lin, 1990, p8). For centuries psoriasis was confused with leprosy. Psoriatics therefore suffered similar fates to lepers: they were exiled from their communities, declared officially dead, and sometimes burnt at the stake. The first accurate description of psoriasis was made in 1809 by Robert Willan. It was not until 1941 that Hebra defined psoriasis as separate from leprosy (Wahba et al, cited in van de Kerkhof, 1999, p3).

Epidemiology

Psoriasis affects about 2% of the population world-wide, predominantly among North European Caucasians. These figures are based on hospital records, and therefore do not include people treated by GPs, or those with mild cases who are untreated (MacKie, 1999, p44).

Rarely found in Native Americans or blacks in the tropics, psoriasis is more common in blacks in temperate zones and in the Japanese (Murray and Pizzorno, 1998, p1513). Psoriasis is aggravated in cold weather (Lin, 1990, p9), and improved by sunshine. This may explain why it is more prevalent in cold rather than hot sunny climates.

Although psoriasis can present at any age, Stern (1997, p352) states that the morbidity is substantial among younger people. Psoriasis can be subdivided into two main types. Type 1, or early onset, starts at puberty and has a genetic link. Type 2, or late onset, is associated with the menopause (Souhami and Moxham, 1998, p334) and is not genetic. Occurrences are equally split between males and females.

Psoriasis often goes into spontaneous remission (Lin, 1990, p16), and can clear during pregnancy (MacKie, 1999, p72). No surveys have assessed the frequency of attacks or the average length of remission and how these relate to genetic and environmental factors (Grob and Folchetti, 1999, p59).

Aetiology

It is generally agreed that psoriasis has a genetic link, especially in early onset psoriasis. Antigen presenting proteins HLA-CW6, HLA-DR7 and HLA-B27 have been implicated, but the exact mode of inheritance is unclear (Souhami and Moxham, 1998, p334). It is estimated that 36% of psoriatics have one or more family member with psoriasis (Murray and Pizzorno, 1998, p1513). Buxton (1998, p9) states that children have a 16% chance of having psoriasis if one parent has it. If both parents have psoriasis this figure rises to 50%. The huge amount of research into the complex genetics of psoriasis can be referred to for more information.

Many triggers of psoriasis have been identified, but the exact cause remains elusive. A genetic predisposition may explain why the following triggers cause psoriasis in some people but not in others.

There may be an immunological trigger for example Köebner's phenomenon is where injury or trauma to the skin, such as an operation causes psoriasis (Souhami and Moxham, 1998, p334). This may also explain why lesions commonly appear on knees and elbows. Psoriasis may also be triggered by an immune response to an antigen, for example due to viral infections such as flu, and bacterial infections such as streptococcal

pharyngitis which has been linked to guttate psoriasis (Souhami and Moxham, 1998, p334). Psoriasis is often found in patients with HIV due to immune deficiency. The effective use of immunosuppressant drugs such as cyclosporin A suggests an autoimmune disease (Barker, 1991, p227). Changes in levels of somatotrophic hormone may affect growth regulation (van der Kerkhof, 1999, p80).

Other triggers can be attributed to lifestyle. The role of stress in psoriasis is disputed, but sudden psychological trauma can initiate psoriasis and cause a relapse. Alcohol is known to makes psoriasis worse. It increases the absorption of toxins from the gut and impairs liver function (Murray and Pizzorno, 1999, p1515). Cigarette smoking is another known trigger, and is also linked with alcohol consumption. Murray and Pizzorno (1999, p1515) link psoriasis with nutrition and incomplete protein digestion.

Many drugs can act as triggers these include: lithium, b-blockers e.g. propranolol, antimalarials e.g. chloroquine (MacKie, 1999, p47) and sudden withdrawal of systemic corticosteroids (Souhami and Moxham, 1998, p334). Environmental triggers include sunlight and UV radiation which can aggravate as well as ameliorated.

Pathogenesis

The pathogenesis of psoriasis is complex. Several mechanisms have been suggested (figure 9), the majority of current research is based on the theory that psoriasis is a T cell mediated disorder. A possible mechanism is that of a cell mediated type IV hypersensitivity reaction. Triggered by trauma or infection it causes extensive chronic inflammation and tissue damage. This type of reaction is known to cause local damage to joints in rheumatoid arthritis and therefore may suggest why some people develop psoriatic arthritis. Also known as a delayed hypersensitivity it takes between 24 and 72 hours to develop. Treatment is by immunosuppressant or corticosteroid drugs, both of which are used to treat psoriasis. The main stages of type IV reactions are detailed below along with some supporting evidence for this as a mechanism for psoriasis.

1) Initial contact with antigen. Langerhans cells are the macrophages of the epidermis. They present (hitherto unknown) antigens to T cells. Changes to the structure of proteins on a cell surface (i.e. by triggers already discussed) could cause the Langerhans cell to treat a self cell as foreign.

2) Clone of sensitised T helper (CD4) cells produced. There are increased numbers of CD4 cells in psoriatic lesions.

3) Second exposure to antigen

4) Sensitised T helpers (CD4/TH1) produce cytokines. There is a tremendous amount of research into the different cytokines and the effects of their absence or increased presence on psoriasis.

Austin et al (113, 752-759) suggest that an imbalance in T cell populations contributes to the chronic or sustained immunological activation of T cells in psoriasis. Psoriatics have increased type 1 producing T cells (CD4 and CD8) which are known to produce pro-inflammatory cytokines.

Asadullah et al (1998, p783-794) state that IL-10 is a major cytokine in psoriasis. They found that expression of IL-10 was reduced in psoriatics and that administration of IL-10 could decrease lesions. Decreased levels of cyclic AMP are associated with decreased IL-10. This could explain why b-blockers such as propranolol, which decrease cAMP formation, cause an increase in psoriasis. Lithium, which can induce or exacerbate psoriasis, elevates levels of IFN-g which inhibits IL-10 expression. Furthermore they state that IL-10 can suppress the antigen presenting capabilities of monocytes, macrophages and dendritic cells. UV radiation treatments are successful as they increase IL-10 production. The authors say that it has been established that psoriasis is a T cell dependant immune disease initiated by presentation of an unknown antigen, and that IL-10 inhibits keratinocyte pro-inflammatory cytokine synthesis.

Yawalkar, Karlen, Hunger, Brand, and Braathen (1998, p1053) found enhanced IL-12 mRNA signals in psoriatic skin and suggest that it has a key role in the pathogenesis of psoriasis as it promotes and maintains the activation of T cells and induces TH1 cytokines such as interferon gamma.

5) Attraction and activation of T cytotoxic cells and macrophages. T cytotoxic (CD8) cells release cytokines which mediate the migrate of leucocytes to inflammation sites by adherence to vascular endothelium. IL8 is found in psoriatic scale and can be produced by epidermal keratinocytes. This suggests that epidermal keratinocytes supply the signals which direct the migration of T cells and neutrophils to the epidermis (Barker, 1991, p228).

6) Cell and tissue destruction. Barker (1991, p229) suggests that psoriatic lesions are caused and perpetuated by interactions between lymphocytes and epidermal cells. These mediate cytokine production and intracellular adhesion.

7) Inflammation response. Chronic inflammation is typified by a mononuclear cell infiltrate composed of macrophages, lymphocytes and plasma cells. Inflammatory mediators have been shown to be activated by substance P, which is elevated in the skin of psoriatics (Murray and Pizzorno, 1999, p1514).

Pathological changes

There are four distinct pathological changes (figures 1-5):

Inflammation is caused by the gathering of leukocytes at the site of injury or infection. Normally this is controlled, but in psoriasis an overreaction is caused.

Hyperproliferation of epidermis. In psoriasis there is increased mitosis. Mitosis is a genetically controlled balance between cAMP and cGMP. Increasing levels of cGMP are associated with increased cell proliferation, while increased levels of cAMP are associated with enhanced cell maturation and decreased cell proliferation. Both decreased cAMP and increased cGMP have been measured in psoriatics resulting in hyperproliferation (Murray and Pizzorno, 1999, p1513-14). Stern (1997, p349) states that keratinocyte production is stimulated by cytokines and lymphokines secreted by CD4+ and CD8 T cells.

There is also a corresponding reduction in the time taken by keratinocytes to pass through the epidermis. Newly formed keratinocytes usually take about 50 days to move from the stratum granulosum to the stratum corneum. In psoriasis this process is about ten times faster (Barker, 1991, p229), although other sources say it is 1000 times faster (Murray and Pizzorno, 1999, p1513).

The stratum basale is the deepest epidermal layer. In psoriasis it may be up to three layers thick, while in normal skin it is a single layer. Acanthosis (an increase in the number of prickle cells) in the stratum spinosum is also seen in psoriasis causing thickening of the epidermis (MacSween and Whaley, 1992, p1115).

Altered maturation of epidermis. Psoriatic skin lacks a stratum granulosum (granular layer) (Barker, 1991, p239). In normal skin it is found beneath the stratum corneum and is 3 - 5 cells thick. This is where keratinocytes become flatter and thicker, and the nuclei start to disintegrate (Marieb, 2001, p151). The silver coloured scales are caused by parakeratosis, the retention of nuclei in the stratum spinosum. This may be due to either missing or overridden differentiation signals (MacKie, 1999, p14).

The scale contains small collections of neutrophil polymorphs called Munro micro-abscesses (Souhami and Moxham, 1998, p334), which migrate through the epidermis from capillaries in the upper dermis (MacSween and Whaley, 1992, p1115). This altered epidermal maturation is not explained by the rapid proliferation of keratinocytes (Souhami and Moxham, 1998, p334).

Vascular alterations. Capillaries in the dermal papillae become abnormally elongated, dilated, and club-shaped loops, and are known as “rete ridges” (Underwood, 1996, p759). The covering epidermis thins (MacSween and Whaley, 1992, p1115). It is the

dilation of these capillaries that causes erythema (Buxton, 1998, p8).

Initial vasodilation is accompanied by an exudate of inflammatory cells and serum in the papilla. This is considered an initiating event in psoriasis since it occurs before epidermal hyperplasia. Vascular alterations appear in the normal skin of psoriatics and remain for some time following treatment (Braverman and Silby, 1982, p12). Stern (1997, p349) states that their persistence is linked with a rapid recurrence of psoriasis.

Clinical features and diagnosis

Plaque psoriasis is the most common type of psoriasis (other types are listed in table B in the appendix). Also known as discoid psoriasis or psoriasis vulgaris, it is clinically diagnosed by a positive family history, with no or mild pruritus. There are sharply demarcated, symmetrical erythemic plaques with a fine silvery scale. These plaques are generally localised to extensor surfaces of the elbows (figure 8), knees (figure 7), and the sacrum. Lesions often occur on the scalp, but rarely on the face. When lesions appear at trauma sites it is known as Köebner's phenomenon (Stern, 1997, p350). Scratching the plaque surface causes a waxy appearance "tache de bougie" (Buxton, 1998, p8), while scrapping off a plaque can reveal small bleeding points from tiny capillaries - Auspitz sign or phenomenon. In chronic psoriasis there is often pitting of nails (figure 6) and toes. Some psoriatics also develop a form of arthritis (MacSween and Whaley, 1992, p1115). A rare feature of chronic psoriasis is pustules on the palms and soles (Williams,1991, p830).

Pruritus (itching) is not often mentioned as a feature of psoriasis. Although rare, it does occur in varying degrees ranging from mild to severe. Buxton (1998, p21) states that pruritus is usually due to secondary infection through broken skin. The itching increases in severity as the lesions increase in size and become more inflamed with a greater body coverage (Stern, 1997, p349). Savin (cited in Gupta et al, 1999, p46) links the perception of itchiness to depression.

Differential diagnosis

A skin biopsy is helpful if clinical features are uncertain (Stern, 1997, p350), as it can be diagnosed by the histological features. This is especially useful in differential diagnosis to distinguish similar conditions from psoriasis.

Lichen planus also appears as well defined, raised lesion, and is associated with Köebner's phenomenon. Unlike psoriasis it is not associated with a family history. Itching is common and lesions appear on the flexor aspects of the limbs, as opposed to the extensor surface in psoriasis (Buxton, 1998, p25).

Seborrhoeic dermatits is difficult to distinguish from mild psoriasis as there is both erythema and scaling. However, the scaling is yellowish rather than silver. Bowen's disease also features sharply demarcated erythematose lesions, but these are resistant to therapy. A biopsy is often required to differentiate it from psoriasis (Kerkhof, 1999, p24). Chronic eczematous dermatitis may look the same, but is more itchy. Chronic eczema has no scaling characteristics (Stern, 1997, p350).

Other conditions include: pityriasis rosea, pityriasis rubra pilaris, mycosis fungoides (parapsoriasis), palmoplantar pustulosis, discoid lupus erythematosus, erythroderma (exfoliative dermatitis), and tinea corporis (MacKie 1999, p52 and Lin, 1990, p20-24). Stern (1997, p350) also includes: T-cell lymphoma, fungal infections, and sub-acute cutaneous lupus erythematosus.

Psychosocial aspects

"Psoriasis is not only a condition of the skin, but a many sided problem, causing medical, social, economic, sexual and emotional distress." (Gibbons, 1992, p16). It damages quality of life as expressed by psoriatics such as Dennis Potter (Savin, 1999, p43).

Psoriasis can cause a great deal of stress. Fortune et al (cited in Savin, 1999, p45) state that anticipation of the reaction of others causes an avoidance of worrying situations such as public places. Furthermore, they suggest that stress is also caused by a clients beliefs or experience of being judged by others based on their skin condition. Psoriasis may not have as much impact on the community as the community has on psoriasis. It can increase the difficulty in establishing social contact and relationships, and can inhibit sexual relations. Severe psoriasis may also prevent some people from working (Savin, 1999, p43). Frequent reoccurrence can affect the mental health of patients (Lin, 1990, p8)

Others may view psoriatics as being abnormal, or tainted, and may fear that it is contagious. This may prevent full social acceptance. (Savin, 1999, p47) and often results in rejection causing stigmatisation, embarrassment, anxiety, depression, and even suicidal thoughts in the individual concerned.

Treatment

> "To ignore the impact of the condition on the patient's life is to fail in treating psoriasis. Like the Cheshire cat that Alice met, it tends to clear slowly and the last remaining patches are often the hardest to clear" (Buxton 1998. p12).

Williams (1991, p829) states that lack of understanding of the psychological and social morbidity of psoriasis by the medical profession can lead to less than ideal care for clients and states that treatments should be tailor made to suit the individual's needs. The clinician needs to ascertain how much psoriasis affects the client and what would achieve a reduction in worry.

Psoriasis is a lifelong condition that varies in intensity (Stern, 1997, p350). The client needs to be reassured that psoriasis is not contagious or malignant. Patients should be made aware of the different treatments available and their side effects. Williams (1991, p829) suggests that factsheets can be very useful. Other considerations include how the client feels about any risks involved with a particular treatment and the amount of time they are able to devote to treatments (Stern, 1997, p350).

Treatment of psoriasis begins with the mildest topical treatments and progress in strength to systemic drugs, until there is improvement in the condition. Williams (1991, p830) suggests that the decision to switch to systemic treatments is complex and should be based on disease severity as well as social and psychological factors.

Topical treatments included: emollients, corticosteroids, Vitamin D analogues (e.g. calcipotril, dithranol (anthralin), tar preparations, and retinoids. UV radiation is both a trigger of psoriasis and an effective treatment. UV treatments such as UVB and PUVA are often used in conjunction with other treatments e.g. cold tar. Williams, (1991, p830) states that all topical treatments can be enhanced by treatment with ultraviolet B radiation. Systemic treatments include: photochemotherapy, methotrexate, retinoids, hydroxurea, cyclosporin A (an immunosuppressant), azathioprine and corticosteroids (Williams, 1991, p830).

Role of the Herbalist

It is increasingly common for herbalists to treat chronic conditions such as psoriasis, which are viewed as a sign of reduced vitality (Mills, 1993, p206-8). As a holistic

practitioner, a herbalists role in the treatment of psoriasis is one that offers emotional support and encouragement. Psoriasis sufferers are often stigmatised by their condition and feel ashamed or embarrassed by the lesions. Holistically the skin functions as a barrier between ourselves and the world we live in, psoriasis is effectively an assault on that barrier. The skin is also said to be the external reflection of what is occurring inside the body.

Herbal treatments are tailored to the individual, and take into consideration the clients physiological, psychological and spiritual states. Lifestyle and stress are also noted. Treatments are designed to treat not only the symptoms, but the cause and so return the body to a state of homeostasis. Lifestyle changes such as diet, reduction of alcohol intake and a cessation of smoking may be suggested. Yoga and meditation may be proposed as a way to decrease stress.

One of the most investigated herbs used in the treatment of psoriasis is cayenne pepper. Clinical trials conducted into the topical use of the active component capsaicin, have shown it to be an effective treatment (Murray and Pizzorno, 1999, p1516-7). Hoffman (1999, p78) suggests the use of nervine tonics to help with associated stress. He also states that although topical treatments with ointments such as comfrey, chickweed or marshmallow help, psoriasis can only be healed from within. A basic mixture of equal parts burdock, cleavers, sarsaparilla and yellow dock is recommended as a starting point. A table of herbs commonly used to treat psoriasis can be found in appendix A.

Conclusion

There seems to be little doubt that psoriasis is a T cell mediated disease and involves a genetic predisposition. The pathogenesis is complex and appears to be a type IV hypersensitivity reaction. Whether the trigger is due to an unknown antigen or whether it is some form of autoimmunity caused by cell protein changes remains to be discovered. For the time being at least, psoriasis remains a lifelong, chronic condition that can be both physically and mentally traumatic. Orthodox and herbal approaches can relieve symptoms but do not provide a cure. Both systems acknowledge that treatment needs to be tailored to suit the individual.