Journal of Biology and Medicine: Open Access

Short Review| Vol 2 Iss 2

Sexual Dimorphism and Other Etiological Factors for Keloids

P D Gupta*

Former, Director Grade Scientist, Centre for Cellular and Molecular Biology, Hyderabad, India

***Corresponding author:** Gupta PD, Former, Director Grade Scientist, Centre for Cellular and Molecular Biology, Hyderabad, India; E-mail: pdg2000[AT]hotmail.com

Received: June 16, 2021; **Accepted:** September 01, 2021; **Published:** September 10, 2021

Abstract

Keloid etiology is multifactorial. Earlier in our study we advocated that there is a delay in epitheliation and due to continued growth of connective tissue which is coming beyond the surface of the skin and then sealing of the wound takes place. This holds true even now but the mechanism behind this process is still ambiguous. In this review we have mentioned various possible etiological factors and their role in scar formation.

Keywords: ***Connective tissue; Sex steroids; Hypertrophic scar; Aberration in wound; Spontaneous; Pathological.***

Men and women are equally likely to have keloid. Keloids scars can be developed due to pathological reasons or may develop spontaneously. However, a key local and very essential factor may be mechanical stimuli which wounds skin. It is due to abnormal wound healing. Keloids project above the surface of the skin and form large mounds of scar tissue. Keloids and hypertrophic scars (Fig. 1A and B) are a result of aberrations of the normal wound healing processes of the skin [1].

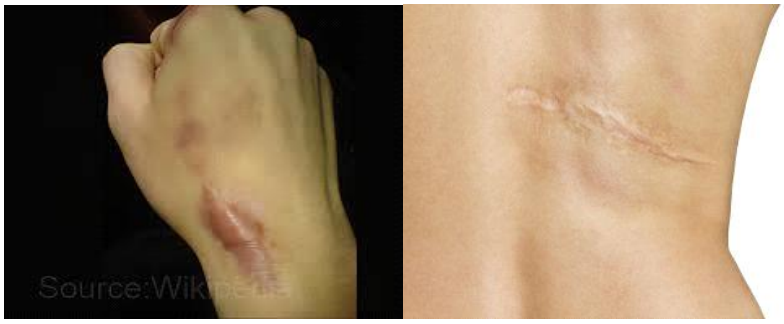

Fig .1. Comparison between A. Keloid and B. Hypertrophic scar.

Unlike normal wounds and hypertrophic scars, keloid epidermis displayed increased expression of K5 and K14 at both the translational and transcriptional levels. The molecular mechanisms in the pathogenesis of keloids appear to be different from those of hypertrophic scars [2].

Citation: Gupta PD. Sexual dimorphism and other etiological factors for keloids. J Bio Med Open Access. 2021;2(2):122.

Electron microscopic histological structures of both the types of keloids i e spontaneous and pathological are almost similar except their basement membrane which is somewhat irregular and not distinctly visible in spontaneous keloids [3], [4]. The transcription and translation of collagen I and III, fibronectin, laminin, periostin, and tenascin are all increased in raised dermal scar tissue. However, hyaluronic acid, dermatopontin and decorin are decreased, and the expression and localisation of fibrillin and elastin fibres in the dermis are altered compared with normal skin and scars. [5], [6]. Although African Americans, Asians, and Hispanics, those who have darker skin are more susceptible then the Caucasians are at a greater risk of developing keloid scar, otherwise there is no exception. People with highly-pigmented (melanin) skin can develop keloids 15 folds more than compared to white skin persons [7].

It is also observed that darker subjects in the same ethnic group are at more risk than the lighter skinned persons for developing keloids; however so far nobody has shown any correlation with melanin and keloids. In addition to melanin other risk factors are also associated with keloid formation: In Asians the scar consists of 'connective tissue' and gristle-like fibers; these constituents are concentrated below the epidermis in the skin in between the fibroblasts which hold them together until the wound is closed. Due to incomplete epithelization, the fibroblasts continue to multiply even after the wound is filled in. The genetics of keloid formation has rarely been documented and no serious experimental data is available, therefore it is not yet understood well. Unfortunately, so far, no reports are available on in vitro model. The mode of inheritance of keloids is not known. Most keloids occur sporadically, but some cases are familial. Piercing bumps tend to appear more quickly and do not grow in size, while keloids take time to form and can continue to grow over time.

Background keloids are proliferative fibrous growths that result from an excessive tissue response to skin trauma. Strange enough to know that there is a observation that people with blood group A have high probability to develop keloids compared with other blood groups, that may be partly explained by the association between the effect of red cell antigens A (which present on the membrane surface of red blood cells and certain epithelial cells) and other facto rs in these patients [8]. A study by Shaheen [7] revealed association between spontaneous keloids and blood group A ($p = 0.01$), which confirms the involvement of antigens A in development of keloids.

The structural and biochemical studies on keloid formation have been reported, however, aetiology, and molecular pathology underlying keloid formation is not clear. Multiple studies suggest that genetic, systemic and local factors may contribute to the development and/or growth of keloids and hypertrophic scars. A key local factor may be mechanical stimuli [9]. According to previous observations genetic predisposition is important. Familial keloids appear to most commonly manifest autosomal dominant or semidominant inheritance, and there may be familial patterns of keloid distribution, however, it is not only heritable disease it has spontaneous aetiology also. Therefore, it may also involve environmental factors and epigenetic mechanisms may also play pivotal roles in the pathogenic processes of keloid formation. Epigenetic modification is a recent area of investigation in understanding the molecular pathogenesis of keloid scarring and there is increasing evidence that epigenetic changes may play a role in induction and persistent activation of fibroblasts in keloid scars. However, there is a significant amount of work required to increase our current understanding of the role of epigenetic modification in keloid disease [10]. A parallel line of thought can be drawn more

logically since keloids are a prototypic fibroproliferative disease, this study investigated whether patients with keloids have an increased cancer risk. Keloid is a skin disease characterized by exaggerated scar formation, excessive fibroblast proliferation, and excessive collagen deposition. Cancers commonly arise from a fibrotic microenvironment; [11]. There is substantial interindividual variation within the microbiome, differences between males and females can be detected. In animal models, sex-specific microbiota differences can affect susceptibility to chronic diseases. In this review, we also discuss the ways in which human microbiome modulates etiology of keloids Engeland et al. [12] hypothesized that sex hormones influence wound healing rates, possibly through their modulating effects on inflammation. Their observations are based on “No strong associations were observed between healing times and estradiol or progesterone levels. However, in younger subjects, lower testosterone levels are related to faster wound closure. Conversely, in older women higher testosterone levels are related to 1) lower inflammatory responses; and 2) faster healing times' '. On the other hand, our observations showed that estrogen helps in wound healing. In fact Engeland et al [12] also agreed to the fact that older women (50-54 years) not yet experiencing menopause healed similarly to younger women and dissimilarly from age-matched post-menopausal women. As mentioned in various studies that intestinal microbiota is specific to gender and this difference regulates various diseases. Markle et al. showed that intestinal microbiome manipulation modifies sex-specific risk for autoimmunity [13]. Pederzoli et al. advocated that Urothelial Bladder Cancer tretment with the Sex-specific microbiome [14] and Min et al. showed Sex-specific association between gut microbiome and fat distribution [15].

REFERENCES

1. Prathiba V, Rao KS, and Gupta PD. Altered expression of keratins during abnormal wound healing in human skin. Cytobios .2001;104(405):43-51.
2. Prathiba V, Kumaresan R, Babu M, et al. Ultrastructural studies of keloids. Biomedi Lett. 1998;58(228):41-50.
3. Janakiraman M and Ramakrishnan KM. Etiology and management of ear lobule keloid in South India. Plast Reconst Sur. 2007;119:495-497.
4. Prathiba V and Gupta PD. Altered expression of keratins during abnormal wound healing human skin. Cytobios. 2001;104(405):43-51.
5. Prathiba V and Gupta PD. Cutaneous wound healing: Significance of proteoglycans in scar formation. Current Sci. 2000;78(6);697.
6. Tanaya W and Alyssa P. Proteoglycans in biomedicine: Resurgence of an underexploited class of ECM molecules Front Pharmacol. 2020;10:1661.
7. Shaheen AA. Risk factors of keloids: A mini review Austin j. Dermatolog. 2017;2:1074.
8. Ramakrishnan KM, Thomas KP. Study of 1,000 patients with keloids in south India. Plast Reconstr Surg. 1974;53:276-280.
9. Tsai CH and Ogawa R. Keloid research: Current status and future directions. Scars Burn Heal. 2019;5:2059513119868659.
10. He Y, Deng Z, Alghamdi M, et al., From genetics to epigenetics: new insights into keloid scarring. Cell Prolif. 2017;50(2):e12326.
11. Lu YY and Tu HP. Risk of cancer development in patients with keloids. Sci Rep. 2021;30;11(1):9390.

12. Engeland CG, Sabzehei B, and Marucha PT. Sex hormones and mucosal wound healing. Brain Behav Immun. 2009;23(5):629-35.
13. Markle Janet GM and Frank DN. Microbiome manipulation modifies sex-specific risk for autoimmunity. Gut Microbes. 2014;5(4):485-493.
14. Pederzoli F and Ferrarese R. Sex-specific alterations in the urinary and tissue microbiome in therapy-naïve urothelial bladder cancer patients. Eur Urol Oncol. 202;3(6):784-788.
15. Min Y and Ma X. Sex-specific association between gut microbiome and fat distribution. Nat Commun. 2019;10(1):2408.

Citation: Gupta PD. Sexual dimorphism and other etiological factors for keloids. J Bio Med Open Access. 2021;2(2):122.