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Analysis of serum 25-Hydroxyvitamin D level in keloid patients

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ABSTRACT

Background: Keloid is solid fibrous tissue tumors that occur due to an imbalance between deposition and degradation of extracellular matrix components, especially collagen. Vitamin D is known to have a beneficial role in slowing the progression of tissue fibrosis and proven to play an important role in the synthesis and degradation of collagen and acts as an anti-inflammatory mediator.

Aim: To determine the difference between serum 25-hydroxyvitamin D level in keloid patients and controls.

Method: This is a cross-sectional analytic study involving 60 subjects consist of 30 keloid patients and 30 controls. Keloid patients were diagnosed by history and clinical examinations, and we conducted blood sampling and measurement of serum 25-hydroxyvitamin D level to the patients and controls.

Results: The mean of serum 25-hydroxyvitamin D level in keloid patients (16.92 ± 5.96 ng/mL) was significantly lower than controls (23.57 ± 6.72 ng/mL), p=0.0001

Conclusion: Serum 25-hydroxyvitamin D level in keloid patients was significantly lower than controls, serum 25-hydroxyvitamin D level in keloid patients was higher in the male group, aged 31-35 years group, duration of disease between 6-10 years group and positive family history.

Keywords: keloid, serum 25-hydroxyvitamin D level

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INTRODUCTION

Keloid is the growth of fibrous tissue that exceeds the limit of the wound, is well-defined and benign.[1-3] Keloid is a dermal fibroproliferative tumor characterized by excessive deposition of extracellular matrix components such as collagen, fibronectin, elastin, proteoglycans, and growth factors.[2,4]

Keloid is known as a dermatologic condition that occurs after surgery, trauma, or can develop spontaneously.[2] Keloid is clinically seen as a fibrous nodule or plaque that is prominent or elevated, elastic or glossy lesions, not covered with hair, and can vary in color from pink to colored like meat or red to dark brown, and usually can be accompanied by itching or pain.[1]

Recent studies explain the beneficial role of vitamin D in slowing the progression of tissue fibrosis as occurs in keloid. Vitamin D has also been shown to play an important role in the synthesis and degradation of collagen.[5,6] Moreover, it is also known that keloid formation may be caused by inflammation arises from the abnormal secretion of proinflammatory mediators, and irregular responses to other inflammatory signals mediated by keloid fibroblasts.[7] Whereas vitamin D can act as an anti-inflammatory mediator.[8] Vitamin D in circulation undergoes metabolism in the liver to 25-hydroxyvitamin D which is the main form of vitamin D in the circulation, and this molecule is the measure for assessing vitamin D status in the body.[9] Therefore, this research was conducted to determine the difference between serum 25-hydroxyvitamin D level in keloid patients and controls.

MATERIAL AND METHODS

This study was conducted from August 2017 to August 2018. This study was an analytic study with a cross sectional design involving 60 patients consisted of 30 keloid patients were diagnosed by history and clinical examinations and 30 healthy controls at General Hospital of Sumatera Utara University, Medan, Indonesia, aged 16-40 years. Every subject who has signed informed consent was included in this study. Exclusion criteria were pregnancy, hormonal disorders namely thyroid, and parathyroid disease; kidney and liver disease, systemic diseases such as cardiovascular disease, diabetes mellitus, tuberculosis and malignancy; autoimmune diseases such as psoriasis, systemic

Table 1 Subject characteristics

Characteristic		n	%
Gender	Male	8	26.7
	Female	22	73.3
Age	16-20 years	5	16.7
	21-25 years	13	43.3
	26-30 years	2	6.7
	31-35 years	2	6.7
	36-40 years	8	26.7
Education level	Elementary school	2	6.7
	Junior high school	5	16.7
	Senior high school	6	20.0
	University	17	56.7
Occupation	Unemployed	18	60.0
	Civil service	8	26.7
	Office worker	3	10.0
	Enterpreneur	1	3.3
Duration of disease	1-5 years	21	70.0
	6-10 years	4	13.3
	11-15 years	1	3.3
	16-20 years	4	13.3
Family history	Father	1	3.3
	Mother	2	6.7
	Siblings	8	26.7
	None	19	63.3
Trigger	Trauma	23	76.7
	Acne vulgaris	1	3.3
	Furuncle	3	10.0
	Immunization	1	3.3
	None	2	6.7
Region	Facial	1	3.3
	Right auricle	1	3.3
	Thoracic	2	6.7
	Right breast	1	3.3
	Left breast	1	3.3
	Right scapular	2	6.7
	Abdominal	6	20.0
	Right deltoid	2	6.7
	Left brachial	1	3.3
	Right cubital posterior	2	6.7
	Left antebrachial	1	3.3
	Right dorsum hand	2	6.7
	Left gluteal	1	3.3
	Right crus	2	6.7
	Left crus	1	3.3
	Right dorsum foot	3	10.0
	Left dorsum foot	1	3.3

Table 2 A comparison serum 25-hydroxyvitamin D level between keloid patients and controls

Subject	Serum 25-hydroxyvitamin D level (ng/dL)		
	n	Mean ± SD	p
Keloid	30	16.92 ± 5.96	0.0001*
Controls	30	23.57 ± 6.72	

*Statistically significant at p<0.05

Table 3 Serum 25-hydroxyvitamin D level based on gender in keloid patients

Gender	Serum 25-hydroxyvitamin D level (ng/mL)				
	n	Mean	SD	Min	Max
Male	8	19.74	4.73	12.20	26.10
Female	22	15.89	6.12	6.60	26.60

lupus erythematosus, and scleroderma; long-term use of using anti-seizure, antibiotic and antiviral drugs namely phenobarbital, phenytoin, carbamazepine, rifampicin, and antiretroviral; and taking vitamin D supplements in the past 1 month. This study has been approved by the Health Research Ethics Commission of the Faculty of Medicine, Universitas Sumatera Utara. We conducted blood sampling and measurement of serum 25-hydroxyvitamin D level to all subjects.

The results were statistically analyzed by independent t test. This test is used to determine the difference between serum 25-hydroxyvitamin D level in keloid patients and controls.

RESULT

Most subjects involved in this study were women, aged 21-25 years, college, unemployed, duration of the disease between 1-5 years, negative family history of suffering from keloid, triggered by trauma, and keloid location in the abdominal region. In this study, the mean of serum 25-hydroxyvitamin D level in keloid patients (16.92 ± 5.96 ng/mL) were lower than controls (23.57 ± 6.72 ng/mL) which were statistically significant (p=0.0001), higher levels of 25-hydroxyvitamin D serum were found in male group (19.74 ± 4.73 ng/mL), aged 31-35 years group (21.90 ± 6.65 ng/mL), duration of disease between 6-10 years group (19.17 ± 8,09 ng/mL) and positive family history group (18.46 ± 6.62 ng/mL).

DISCUSSION

Vitamin D has been known to have a beneficial role in slowing the progression of tissue fibrosis and is proven to play an important role in the synthesis and degradation of collagen and acts as an anti-inflammatory mediator.[5-7]

In this study, there was a significantly lower mean of serum 25-hydroxyvitamin D level between keloid subjects compared with controls (p=0.0001). This is consistent with a study conducted by Medikawati et al. which found significant differences in mean plasma 25-hydroxyvitamin D level in keloid subjects with p <0.001.[10] The study by Yu et al. who conducted a study on the relationship between 1,25-dihydroxyvitamin D level with the risk of occurrence of keloid where keloid patients were found to have a mean level of serum 1,25-dihydroxyvitamin D lower than controls.[5]

In this study, the mean of serum 25-hydroxyvitamin D level of keloid patients based on sex was found to be higher in men than in women. Research discussing vitamin D level in keloid patients based on sex is still rarely found, but in studies of vitamin D level in the general

Table 4 Serum 25-hydroxyvitamin D level based on age in keloid patients

Age	Serum 25-hydroxyvitamin D level (ng/mL)				
	n	Mean	SD	Min	Max
16-20 years	5	15.40	5.36	6.90	20.60
21-25 years	13	19.10	5.10	9.90	26.10
26-30 years	2	19.25	10.11	12.10	26.40
31-35 years	2	21.90	6.65	17.20	26.60
36-40 years	8	12.48	4.87	6.60	23.20

Table 5 Serum 25-hydroxyvitamin D level based on duration of keloid disease

Duration of disease	Serum 25-hydroxyvitamin D level (ng/mL)				
	n	Mean	SD	Min	Max
1-5 years	23	16.99	5.92	6.60	26.60
6-10 years	4	19.17	8.09	9.90	26.40
11-15 years	1	13.70	-	13.70	13.70
16-20 years	4	15.07	5.42	11.90	23.20

Table 6 Serum 25-hydroxyvitamin D level based on family history

Family history	Serum 25-hydroxyvitamin D level (ng/mL)				
	n	Mean	SD	Min	Max
Present	11	18.46	6.62	6.60	26.60
None	19	16.02	5.52	6.90	26.40

population by Hagenau et al. and Lagunova et al. found that vitamin D level was higher in women compared to men.[11,12]

The highest mean level of serum 25-hydroxyvitamin D was found in the age group 31-35 years in this study. The authors have not found a study of age-based 25-hydroxyvitamin D level in keloid patients, but according to Hagenau et al. study of global serum 25-hydroxyvitamin D status in the general population it was found that the lowest serum 25-hydroxyvitamin D level was ≤15 years and highest at age 66-75 years.[11]

In this study, the lowest mean of serum 25-hydroxyvitamin D was found in the study subject group who had experienced keloid for 11-15 years. The role of vitamin D in the pathogenesis of the occurrence of keloid has been discussed previously, but to determine whether there is a role for vitamin D in the course of the duration of the disease requires further research.

In this study also found the mean level of serum 25-hydroxyvitamin D was higher in research subjects who had a positive family history compared with those who have a negative family history of suffering from keloid. As we known keloid are preceded by skin trauma in genetically susceptible individuals, where vitamin D involvement is found in the development of keloid.[5] It has been reported that certain polymorphisms in DNA coding for vitamin D receptor proteins correlate with keloid formation.[13] In a study by Yu et al. who conducted a study on the relationship between polymorphism of vitamin D receptor gene and level of 1,25-dihydroxyvitamin D with the risk of keloid was found that gene polymorphism from vitamin D receptors affects levels of serum 1,25-hydroxyvitamin D in keloid patients.[5]

CONCLUSION

Serum 25-hydroxyvitamin D level in keloid patients was significantly lower than controls, serum 25-hydroxyvitamin D level in keloid patients was higher in male, aged 31-35 years, duration of the disease between 6-10 years and positive family history. Further studies are needed to find the relationship between serum 25-hydroxyvitamin D level and keloid severity.

CONFLICT OF INTEREST

None

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