

Role of Vitamin D in Chronic Rhinosinusitis

A systematic review and Meta-analysis study

For Partial Fulfillment of Master Degree in Otorhinolaryngology

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LIST OF ABBREVIATIONS

<i>Abbr.</i>	<i>Full Term</i>
1,25(OH)₂VD₃	1,25-dihydroxyvitamin D ₃
AFRS	Allergic fungal rhinosinusitis
CD4	Cluster of differentiation 4
CL	Confidence limits
CRS	Chronic rhinosinusitis
CRSsNP	Chronic rhinosinusitis without nasal polyps
CRSwNP	Chronic rhinosinusitis with nasal polyps
CS	Cigarette smokers
CT	Computed tomography
DCs	Dendritic cells
DF	Degrees of freedom

<i>Abbr.</i>	<i>Full Term</i>
FEM	Fixed-effects method
HIV	Human immunodeficiency virus
HNSCC	Head and neck squamous cell carcinoma
I²	I-square
IgE	Immuno-globulin type E
IgG	Immuno-globulin type G
IL	Interleukin
IU	International unit
Lscc-	Laryngeal squamous cell carcinoma
MRI	Magnetic resonance imaging
ng/ml	Nanogram/milliliter
NJ, USA	New Jersey, United States of America
nmol/L	Nanomoles per litre

<i>Abbr.</i>	<i>Full Term</i>
Non-CS	Non-cigarette smokers
ORL	Otorhinolaryngology
REM	Random-effects method
SE	Standard error
SMD	Standardized mean difference
Th	T-helper Cells
TMJ	Temporo-mandibular joint
U.S.	United states
UVB	Ultraviolet B
VD3	Vitamin D3
VDR	Vitamin d receptor
VS.	Versus

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INTRODUCTION

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Chronic rhinosinusitis (CRS) is one of most common diseases affecting people all over the world due to inflammation of mucosal lining of nose and nasal sinuses. No specific treatment can treat CRS long life, but different drugs and modalities to control the disease and decrease the attacks. Recent guidelines defined CRS depends on symptoms, endoscopic examination and radiological finding (**Fokkens, 2012**). Pathological explanation of CRS is still unclear. Most theories refer CRS to host (human body) and the surrounding environment interaction. (**Bachert, 2007**). CRS can be presented in many forms as chronic rhinosinusitis without nasal polyps (CRSsNP) and chronic rhinosinusitis with nasal polyps (CRSwNP) (**Schleimer, 2009**).

Vitamin D was usually linked with bone mineralization, calcium level in plasma and deposition in bone, but now vitamin D is considered to have an immunomodulatory role specially in allergic diseases (**Hewison, 2008**). Low vitamin D3 level is considered now as one of the risk factors for many of allergic diseases as asthma and recurrent upper respiratory tract infection (**Brehm, 2009**). Vitamin D3 is initially generated in

the skin from non-enzymatic conversion of pro-vitamin D3 to pre-vitamin D3. The liver contains 25-hydroxylase, which catalyzes the conversion of pre-vitamin D3 to 25-hydroxy-vitamin D3, the form that most accurately relates to skin and dietary exposure. 25-hydroxy-vitamin D3 finally converted to the active metabolite 1,25-dihydroxy-vitamin D3 by the kidneys, although other tissues, including respiratory epithelial cells, also contain functioning 1- α -hydroxylase (**Rosen, 2011**).

The ability of vitamin D3 to augment innate and adaptive immune responses has sparked interest in its immunologic role in allergy. Results of recent studies indicate that vitamin D3 plays a significant role in maintaining skin integrity, reducing pathogenic colonization, and dampening sensitization in atopic dermatitis (**Benetti, 2015**).

Recently, **Mostafa *et al* (2016)** found that patients with CRS have vitamin D level lower than normal, specially CRSwNP and allergic fungal rhinosinusitis (AFRS).

Also the available evidence indicates that is a significant relationship between low vitamin D3 levels and polypoid CRS phenotypes. The association between vitamin D3 levels and disease severity and vitamin D3 potential for drug therapy

remains unclear, which warrants further research in the area “
(Stokes *et al*, 2016)