

Coral stone landscape and pterygia; is there an association?

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Abstract:

The author examined 753 adults from 5 atolls that form a part of "Outer Islands" region of Republic of Marshall Islands (RMI), during his supervisory tour (July – Nov 2002); the visit aimed at providing primary health care services to the communities of outer islands region. Only the pterygia are highlighted in the following text.

Each individual had a detailed interrogation followed by physical examination and glucometer assay of fasting blood.

The dominant ocular pathologies included pterygia (14.5%), cataract (12%) and aphakia (1.5%). Of these 109 cases of clinically asymptomatic pterygia, 95(92%) were bilateral; the disease prevailed more among women (62%). Interestingly, residents of these atolls (esp. women) attended to daily chores on grounds (adjoining their dwellings) covered with brightly shining coral stones. There was no causal association of diabetes mellitus (DM) pterygium when compared with non- diabetics.

It is likely that the atoll residents were exposed not only to atmospheric ultra violet radiation (UVR), but also to ultra violet reflections from such bright coral stones beds accentuating the total effect comparable to the role of sandy beaches.

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Methods

The Republic of Marshall Islands (RMI) is a group of atolls located between longitudes 162°20'E & 171°55' E and latitudes 4°38' N & 11°30' N; they form one of the Micronesian countries and have a population of 50,84.³ Almost 33% of the RMI people inhabit "outer islands" region consisting of 2100 islands.

Each atoll has an inner lagoon and an outer ocean, with a narrow strip of crescent shaped landmass that grows sparse vegetation and has equally sparse population that averages 48 persons/square mile (range: 95 — 2069 persons/atoll). The entire area is sunny, hot and humid with a wet season from May to November. Rice, seafood, coconut, breadfruit, bananas, and pandanus constitute the major part of the staple food.

Based upon the health needs of these outer atolls and their service delivery demands, a total of 5 atolls were selected for an initial round of study (table 1) that included the existent infrastructure and community health.

Introduction

Pterygium is a triapngular growth of abnormal fibrovascular tissue that may eventually invade the cornea. Its causal link with DM is unclear.

On the other hand, the disease that is known to be endemic in warm and dry localities,¹ is said to have causal association with exposure to UVR.¹ A threefold risk upon exposure to UVR has been described.² The following describes the

author's clinical experience with pterygia in the outer islands people of the Republic of the Marshall Islands, its association with coral stone beds. Such coral beds are used to beautify the land around dwellings and where people spend most of their daylight hours to avoid hot, humid and dark indoors.

Table 1: Population of the atolls and number of people examined (n.753)

Atolls	Over 15 years (census 1999) ⁴	Number of people examined	(%)
1. Ailinglaplap	949	168	17%
2. Ebon	488	164	33%
3. Namu	503	202	40%
4. Namdrik	397	107	26%
5. Maleolap	474	112	23%
Total	2826	753	26%

Results

The sample consisted of a 753 ethnically homogenous adults (male: 395, female: 358) representing 26 % of the registered population on the atolls (table 1); the majority had migrated to Majuro (the capital of RMI), Ebeye (Kwajalein-second populace atoll) and to the USA in

search of employment and better living. Several people had more than one disorder. There were 301 (40%) cases of Obesity ranked highest followed by overweight in 263 (35%), diabetes in 240 (32%), ocular disorders in 220 (28%) and hypertension in 52(7%).

Pterygia had affected 109(14.5 %) persons, cataract 90(12%), and aphakia 11(1.5%) individuals. DM was present in 25.7 % of the pterygial and 25.2 % of the cataract cases (table 2).

Table 2: Occurrence of diabetes mellitus with pterygium at each atoll

Disease	Ailinglaplap	Ebon	Namu	Namdrik	Maleolap	Total
Diabetes	8	5	7	2	6	28
Pterygium	26	19	23	12	29	109
Association(%)	30.8	26.3	30.4	16.7	20.7	25.7

Whilst only thin deposits of sand existed between the lagoon and the land, there were uniformly layered heaps of coral stones both around and in between individual dwelling, and the people spend the day outside the house to save themselves from stifling indoor heat, humidity and darkness. In addition, it seemed, coral stone reinforcement of the ground provided for a better grip while walking and hid away "messy" surroundings! Nobody wore a hat whilst few men used dark glasses.

Discussion

In contrast to previously published reports about the

relationship among coral stone heaps, presumptive compounding of UVR and high prevalence of pterygia remains ill defined. Also what is unclear is the ability of coral stones to absorb the UVR and its subsequent emission.

There is a strong possibility that the reflective property of shiny coral stone could compound the total effect of atmospheric UVR more effectively than the sandy beaches of pacific countries. Thus, it is conceivable that the Marshalese of outer islands of this country are exposed to a far heavier dose of UVR, resulting in higher prevalence of pterygia. A large majority of these people engage in outdoor activities on the bright coral stone grounds, which make them vulnerable to the accentuated effect of UVR. The precise cause and effect

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Table 3. Prevalence of pterygia in different areas regions

Areas	% Prevalence of pterygium
Victoria, Australia ⁵	6.7
Chinese population, Singapore ⁶	6.9
Sumatra, Indonesia ⁷	10.0
Barbados, Caribbean ⁸	10.2
Marshalese, RMI	14.5

association of pterygia with UVR and its accentuated effects along sandy beaches (table 3), the present observations attempt to associate pterygiurri with coral stone deposits. The practice of heaping white coral stones (*Lā* in Marshalese) on grounds surrounding each house appears unique in contrast to several other island nations. Whilst the role of UVR in the occurrence of pterygia among the inhabitants of sandy areas is well known, there are no published accounts about shiny coral stone pavements having similar causal association.

References

1. Coroneo MT. Pterygium as an early of ultraviolet isolation: a hypothesis *Br J Ophthalmology* 1993; 77:734-739
2. Moran DJ, Hollows FC, Pterygium and ultraviolet radiation: a positive correlation. *Br J Ophthalmology* 1984; 68: 343-346.
3. Taylor HR. The biological effects of VU-B on the eye Photochem, *Photobiol.*1989;50: 489-92.

4. Census 1999; *Census of population and housing: Survey. American Journal of Ophthalmology*, 131:2: Final Report, Office of the planning and Statistics, 176-183. Majuro, Marshall Islands, June 1, 1999.
5. Catherine A McCarty, Cara L Fu, and Hugh R Taylor Epidemiology of pterygium in Victoria, Australia *Br. J. Ophthalmol*, Mar 2000, 84:289-292.
6. Tiem Yin Wong, Paul I. Foster, Gordon J. Johnson, et al. The prevalence and risk factors for pterygium in an adult Chinese population in Singapore: the Tanjong Pagar
- There is a strong possibility that the reflective property of shiny coral stone could compound the total effect of atmospheric UVR more effectively than the sandy beaches of pacific countries.**
7. G Gazzard, S-M Saw, NI Farook, et al Pterygium in Indonesia: prevalence, severity and risk factors. *Br J Ophthalmol*, Dec 202, 86: 1341-1346.
8. Rajiv Luthra, B. Nemeure, Suh-Yuh Wu, et al. Frequency and risk factors for Pterygium in the Barbados Eye Study. *Arch Ophthalmol* 2001 119: 1827 1832.

There is so much in the world for us all if we only have the eyes to see it,
and the heart to love it, and the hand to gather it to ourselves
(Lucy Maud Montgomery 1874 - 1942)