

Chrysiasis induced by Q Switched Nd:YAG laser: A case report and review of literature

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Abstract

Chrysiasis refers to blue to slate gray skin pigmentation induced by prolonged treatment with gold salts. Although now an uncommon modality for treatment of arthritis, chrysiasis may still be seen as it can develop even decades after discontinuation of gold therapy. We hereby report a rare case of Q-switched Nd:YAG laser induced chrysiasis in a 65 year old woman who underwent laser treatment for melasma with immediate blue-gray discoloration. She was a known case of rheumatoid arthritis with history of treatment with oral gold salts about 20 years ago. Interestingly this is the first case of chrysiasis induced by laser being reported outside of US and Canada. Dermatologists must be aware of risk of laser induced chrysiasis in individuals with history of gold therapy and this point should be included in history taking as a leading question especially in patients who have received treatment for autoimmune arthritis (PsA, RA).

Key-words: Q Switched Nd:YAG laser, Chrysiasis

Key Messages: Dermatologists must be aware of risk of laser induced chrysiasis in individuals with history of gold therapy and this point should be included in history taking as a leading question especially in patients who have received treatment for autoimmune arthritis (PsA, RA).

Introduction

Chrysiasis refers to blue to slate gray skin pigmentation induced by prolonged treatment with gold salts. Although now an uncommon modality for treatment of arthritis, chrysiasis may still be seen as it can develop even decades after discontinuation of gold therapy. We hereby report a rare case of Q-switched Nd:YAG laser induced chrysiasis in a 65 year old woman who underwent laser treatment for melasma with immediate blue-gray discoloration. She was a known case of rheumatoid arthritis (RA) with history of treatment with oral gold salts about 20 years ago. Interestingly this is the first case of chrysiasis induced by laser being reported outside of US and Canada. Laser induced chrysiasis was first reported by Trotter MJ et al in 1995, later Yun PL et al, Almoallim H et al, Geist DE et al and most recently Cohen and Ross also reported similar findings (Table 1).

Case History

A 65-year old woman presented to the clinic for the treatment of pigmentation on her face. The pigmentation was diagnosed as melasma and she was offered Q-switched Nd:YAG laser treatment. This was her first treatment with any laser. Immediately after laser treatment she developed an erythema over bilateral cheeks and nose which evolved to blue-gray discoloration over the same areas (Fig. 1-3). Initially it appeared to be purpura but the discoloration was still persistent and was attributed to spost inflammatory hyperpigmentation. The pigmentation failed to lighten even after 12 weeks of treatment for pigmentation with topical de-pigmenting agents. No attempt was made to

re-challenge or to clear the pigmentation with same laser.



Fig. 1



Fig. 2



Fig. 3

Fig. 1, 2, 3: Blue-gray macules over cheek area extending to dorsum of nose

Her medical history was significant for rheumatoid arthritis of about 25 years and was treated with DMARDs (Disease Modifying Anti-Rheumatic Drugs) including NSAIDs, methotrexate and steroids. She also gave history of oral gold therapy 20 years prior. The total dose of gold therapy taken couldn't be determined.

On examination there were blue-gray macules present over cheek area extending to dorsum of nose (R > L) without texture changes (Fig. 1-3). On full body examination there was no discoloured patch elsewhere. There was no discoloration of sclera, nails or hair.

Table 1: previous cases of laser induced chrysiasis

Author	Associated disease	Laser used	Pigmentation induced	Diagnosis /investigation	Treatment given
Trotter MJ et al ¹ 1995 vancouver	PsA	Q Sw Ruby	Immediate	histopathology, transmission electron microscopy	N/A
Yun PL et al ² 2002 boston	RA	Q Sw Alexandrite	Immediate	histopathology	Normal mode ruby laser with complete resolution in 2 sessions
Hani Almoallium et al ³ 2006 vancouver	RA	Q Sw Nd:YAG	Immediate	clinical	N/A
Geist DE et al 2006 Boston	RA	Q Sw Ruby	Appeared at areas of treatment ?immediate	Clinical	N/A
Cohen and Ross 2015 california	RA	Q Sw Alexandrite	Immediate	Clinical	Multiple lasers used with complete resolution

Discussion

Chrysiasis refers to blue to slate gray skin pigmentation induced by prolonged treatment with gold salts. The gold is deposited in both sun-exposed and

non-exposed skin, pigmentation over the skin is often more noticeable in photo-exposed areas.

Although because of availability of DMARDs and biological agents, gold salt administration is now uncommon modality for treatment of rheumatoid arthritis but chrysiasis may still be seen as it can

develop even decades after discontinuation of gold therapy.

Gold particles concentrate in the cornea, lens, sclera, skin and reticulo-endothelial system.

On histopathology aggregates of gold are seen in the reticular and papillary dermis in a pre-dominantly perivascular distribution. Gold deposits appear as black particulate matter within macrophages clustered around dermal blood vessels. Electron-microscopy reveals that these particles are electron dense and localize in lysosomes called 'aurosomes'. The mechanism of hyper-pigmentation is due to enhanced melanogenesis by indirect increased tyrosinase activity and physiochemical changes in gold structure within the skin in sun exposed areas.

Laser induced chrysiasis in patients treated with gold is primarily an irradiance dependent rather than fluence dependent phenomenon. The irradiance of Q switched lasers used in dermatology is very high and may induce chrysiasis.

Yun et al have suggested use of lasers between 550 and 850 nm for treatment of laser induced chrysiasis. Wu et al reported improvement with 595nm pulsed dye laser in a case of extensive chrysiasis. Sun avoidance and protection to minimize UV induced exacerbation is also important. Dermatologists must be aware of risk of laser induced chrysiasis in individuals with history of

gold therapy and this point should be included in history taking as a leading question especially in patients who have received treatment for autoimmune arthritis (PsA, RA).

References

1. Trotter MJ, Tron VA, Hollingdale J, Rivers JK. Localized chrysiasis induced by laser therapy. *Arch Dermatol.* 1995 Dec;131(12):1411-4.
2. Yun PL, Arndt KA, Anderson RR. Q-switched laser-induced chrysiasis treated with long-pulsed laser. *Arch Dermatol.* 2002 Aug;138(8):1012-4.
3. Almoallim H, Klinkhoff AV, Arthur AB, et al. Laser induced chrysiasis: disfiguring hyperpigmentation following Q-switched laser therapy in a woman previously treated with gold. *J Rheumatol.* 2006;33:620-621.
4. Geist DE, Phillips TJ. Development of chrysiasis after Q-switched ruby laser treatment of solar lentigines. *J Am Acad Dermatol.* 2006 Aug;55(2 Suppl):S59-60.
5. Philip R. Cohen, E. Victor Ross. Q-Switched Alexandrite Laser-induced Chrysiasis. *J Clin Aesthet Dermatol.* 2015 Sep;8(9):48-53.
6. Jashin J. Wu, Nicholas G. Papajohn, Jenny E. Murase, Willem Verkruyse, Kristen M. Kelly. Generalized Chrysiasis Improved with Pulsed Dye Laser. *Dermatol Surg.* 2009 Mar;35(3):538-542.
7. Oryschak AF, Ghadially FN. Evolution of aurosomes in rabbit synovial membrane. *Virchows Arch B Cell Pathol.* 1976;20:29-39.