

DERMA

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Dear Doctor,

Greetings from Micro Labs. We are happy to bring you “**Derma Today**” which contains latest and interesting news in the field of Dermatology.

This issue contains:

1. Possibilities and Perspectives of use of High-Frequency Ultrasonography in Teledermatology.
2. A case of Acquired acrodermatitis enteropathica due to ketogenic diet.
3. A prospective study to assess the treatment of early-stage mycosis fungoides

Should you require any article or, medical information, please feel free to contact us
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forward to your valuable feedback. Best

Regards,

Medical Team, Micro Labs Limited.

Possibilities and Perspectives of use of High-Frequency Ultrasonography in Teledermatology

Introduction

Telemedicine is a branch that utilizes communication technologies in healthcare to exchange medical information for the diagnosis, treatment, prevention, research, evaluation, and education over a distance.

Two types currently in practice are “real-time” or “live interactive” (LI) (enables direct communication sender–recipient with an immediate result) and “store-and-forward” (SAF) telemedicine (digital images and patient data are captured, transferred, and stored).

Principle aim of teledermatology seems to be to consult and to educate. Digital communication brings possibilities for the exchange of medical information between the patient and the specialist. What is more, a recent modality— “patient-assisted teledermatology,” or “home-based teledermatology”—has been vigorously developing.

After first visit and face-to-face diagnosis by the dermatologist, a patient is supposed to send pictures documenting the skin’s condition. This form combines SAF teledermatology and mobile technology tools.

Particularly useful for patients with chronic diseases, such as psoriasis, atopic dermatitis, vitiligo, or leg ulcers.

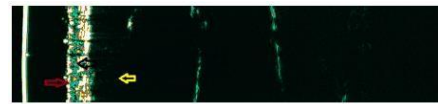
Current article discusses about present actual applications of 20-MHz ultrasonography in dermatology and analyze the possibility of its use as a valuable tool in teledermatology, especially in managing patients suffering from chronic skin diseases.

Principles Of High Frequency-USG

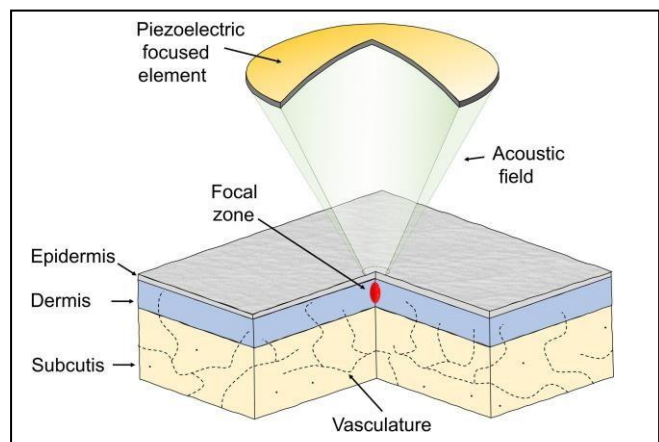
Routine imaging of the abdominal organs is possible with the use of ultrasound waves in the 3–5-MHz range, while for the assessment of more superficial structures (such as lymph nodes, testes, or the thyroid gland), frequencies in the range 7.5–15 MHz are needed.

Ultrasound transducers emitting waves with higher vibration ranges of 20 MHz (High Frequency Ultrasonography, HF-USG) and higher (Ultra High Frequency Ultrasonography, UHF-USG) are used for skin examination.

Use of 20-MHz heads allows for images of structures at a depth of 8–10mm and, according to some manufacturers, even up to 15mm. The higher the frequency, the better the picture resolution.



HF-USG image of healthy skin of the forearm





Properties HF-USG in Teledermatology

Various skin pathologies change the echogenicity of its individual layers, which can be used to analyze the ultrasound image.

In basal cell carcinoma (BCC), the HF-USG can detect the presence of hyperechoic spots. It is considered a recognized indication for HF-USG. The preoperative determination of the surgical margins determines the future management and patients' prognosis can be assessed.

In case of melanoma, echolucent areas can be observed, with a shape depending on the subtype. The nodular form may have a spherical arrangement, while superficial spreading melanoma presents as an echolucent area parallel to the entry echo.

In benign melanocytic nevus, with HF USG, visualised as hypoechoic mass .

Neoplastic cells and Inflammatory cells cause a reduction of skin echogenicity and may result in the formation of a linear band underneath the entry echo, known as the subepidermal low echogenic band (SLEB).

SLEB formation is well-documented in inflammatory diseases, including psoriasis and atopic dermatitis.

High correlation between SLEB and PASI index indicates that HF-USG quickly complements the measurement of the severity of skin lesions in psoriasis in an objective way.

In squamous cell carcinoma (SCC) and actinic keratosis, scaling may disturb the image's interpretation.

In HF-USG, there is a possibility to distinguish a lesion of the type of post-inflammatory hyper/hypopigmentation from a non-specific infiltrative lesion.

Advantages of HF-USG

1. Non –invasiveness
2. Safety
3. Possibility of multiple scans without the need to prepare the patient in advance.
4. To qualify patients for biological therapies and research programs.
5. In case of teledermatology, the possibility of transmitting images in between clinicians and of archiving images and analyzing them over time contributes an extremely useful.
6. Teleconsultation with the use of HF-USG may improve the treatment process of chronic dermatological diseases requiring long-term care.
7. Possibility of simultaneous dermoscopy and ultrasound of the skin may have a prognostic significance in skin tumors.

Limitations of HF-USG:

1. High price
2. Restricted availability of the apparatus.
3. In the case of dermoscopy, acquiring the ability to interpret an ultrasonographic image requires appropriate training.
4. HF-USG does not possess sufficient resolution and its diagnostic properties are much lower.
5. Other techniques of non-invasive skin visualization are gaining interest in regard to associations with teledermatology like reflectance confocal microscopy (RCM). RCM allows



an in vivo evaluation of various skin lesions on the cellular level—nearly to histologic resolution.

Other Limitations:

- Thickness of the tumor determined by ultrasound is slightly greater than the thickness determined histologically, due to shrinkage of the material during histological preparation and accumulation of inflammatory cells underneath the tumor.
- Proper margin assessment, tumor size, mainly when it crosses the dermis border and penetrates the subcutaneous tissue, which is also hypoechogenic.
- Preoperative evaluation of the tumor margins may also be difficult in patients with evident photoaging, where elastosis decreases the skin echogenicity, similarly to the neoplastic cells

Due to these limitations, an initial diagnosis of probable pathology should be performed using a dermoscope, followed by an evaluation of disease extent using HF-USG.

Inclusion of dermatoscopic images improves triaging decisions, including a need for an excision for both melanomas and other skin cancers.

Monitoring properties of HF-USG seem to be particularly useful in assessing the therapeutic outcomes in patients with mycosis fungoides.

Conclusion

High-frequency ultrasonography (HF-USG) is a non-invasive and in vivo method of visualization of the skin and upper part of subcutaneous tissue based on ultrasounds above 20 MHz. It is particularly as a rapidly evolving method in the objective evaluation of the severity of various chronic skin diseases.

Reference:

Polanska A et al. High-Frequency Ultrasonography—Possibilities and Perspectives of the Use of 20 MHz in Teledermatology. Front. Med. 2021; 8:619965.

A case of Acquired acrodermatitis enteropathica due to ketogenic diet.

Introduction

Acrodermatitis enteropathica (AE) is associated with zinc deficiency. The congenital form is caused by an autosomal recessive genetic defect resulting in decreased zinc absorption, whereas acquired AE is due to reduced zinc intake or absorption from other causes.

AE most commonly affects individuals with alcoholism, vegetarianism, premature infancy, and malnourishment.



Current is a case of acrodermatitis enteropathica occurring due to ketogenic diet.

Case Report

Case presentation:

A 10-year-old boy presented with perioral, periorbital, perigenital and acral eruption for the past 2 months. Patient had a history of hypoxic ischemic encephalopathy and severe epilepsy since infancy. Mother has been noticing mild hair loss and more foul-smelling loose stools.

Treatment included levetiracetam and clobazam.

Patient adherent to a ketogenic diet for 3 months, which resulted in fewer seizures according to his mother. As the patient had dysphagia and epilepsy, the patient was administered a liquid ketogenic formulation consisting of a complete amino acid mixture and both long-chain and medium-chain triglyceride emulsions through a gastrostomy tube. Mineral and vitamin supplementations were recommended but not given.

Laboratory studies showed zinc levels of 15 mcg/dL. A biopsy showed superficial epidermal necrosis with cytoplasmic vacuolization and scattered dyskeratotic keratinocytes consistent with the clinical impression of acquired zinc deficiency.



ketogenic diet was discontinued and initiated treatment with zinc gluconate 50 mg/day and topical emollients. His symptoms began improving within 3 days and had completely resolved one month later.

Discussion:

Acquired Acrodermatitis enteropathica is associated with many causes of malnutrition, including veganism, alcoholism, anorexia nervosa, and bariatric surgery.

Classic ketogenic diet is a high-fat, low-carbohydrate diet, comprising primarily long-chain triglycerides, with a 3:1-4:1 ratio of grams of fat to carbohydrates and protein. Diet has been used in epilepsy.

Ketogenic diet is associated with zinc and vitamin C deficiency. Adhering to a strict ketogenic diet must have routine monitoring of micronutrients with appropriate supplementation. Ketogenic diet has also been reported to cause prurigo pigmentosa.

Conclusion

A case of acrodermatitis enteropathica was successfully treated with Zinc and emollients.

Reference:

Osmani S et al. Acquired acrodermatitis enteropathica from a ketogenic diet. JAAD Case Reports 2021; 9:75-7.

3. A prospective study to assess the treatment of early-stage mycosis fungoides

Introduction

Mycosis fungoides (MF) is long-standing, scaly, patch lesions preferentially involving the buttocks and body areas infrequently exposed to sunlight.

MF has a good prognosis in early stage (median survival >15 years, 5-year survival >80%) compared to advanced-stage disease which has a median survival of 4-5 years and a predicted 5-year survival of approximately 50%.

Objective of the current study is to evaluate the differences in first-line treatment approach and in particular to compare the patient characteristics according to first line therapy choice - systemic versus observation versus Skin-directed therapies; the overall response rate (ORR) according to different treatments and stages; the health-related quality of life (HRQoL).



Methods

A multi-center prospective international study involving 402 patients was done.

Patients included were those with diagnosis of "early-stage MF" (stage IA, IB, IIA) based on a central clinicopathological review process to confirm diagnosis and stage were included in the present study.

Each patient data were collected with respect to clinical, hematological, pathological data at the time of diagnosis and updated annually or earlier in the event of stage progression.

HRQoL was assessed using the Skindex-29 test as already reported . Response to treatment was evaluated according to standard consensus guidelines.

Proportion of patients with a Complete Response (CR)(100% clearance of skin lesions) and Partial Response (PR) defined as 50% - 99% clearance of skin disease based on the modified Severity Weighted Assessment Tool (mSWAT) score without new tumors in patients with T1,T2, T4 only skin disease, lasting for at least four weeks were assessed.

Treatment of patients involved:



- (1) Skin-directed therapies (SDT): topical corticosteroids, phototherapy (UVA, broad-band UVB, narrow-band-UVB, NB-UVB), local radiotherapy, total-skin electron beam therapy (TSEBT), topical nitrogen mustard, topical carmustine.
- (2) Biological response modifiers: interferon (IFN), retinoids, bexarotene, extracorporeal photochemotherapy (ECP), low-dose methotrexate.

Corticosteroids were considered topically as a treatment only if performed as single therapy, it was not recorded when in association with other treatments.

Results

Frequently used skin directed therapies were topical steroids (39.2%) and phototherapy (36.9%; 18.5%=PUVA and 18.4%= UVB,). Topical steroids were more frequently used in stage IA (48%vs32% in IB; chi-square:9.643, $p=0.002$), whilst phototherapy in IB (47%vs29%; $p < 0.0001$).

Patients with patches only (T1a/T2a) were more likely to receive UVB (22%) than PUVA (13%) whilst patients with plaques were statistically more frequently treated with PUVA (25%vs15% UVB ; $p=0.024$).

No patients received Total Skin Electron Beam Therapy(TSEBT) as first-line therapy.

Complete response was seen in 26% and PR in 41% of patients, accounting for a 67% ORR. Moreover, 31% of patients achieved stable disease and only 6 had disease progression during their first-line treatment. The ORR decreased with increasing T-class, from 74% for T1a to 61% for T2b (T1a vs T2b: chi-square:4.260, $p=0.039$).

Higher mSWAT values and FMF were associated with a trend towards lower ORR without statistical significance. Patients with Stage IIA disease had a significantly lower ORR (39%) compared to IA (73%) and IB (66%) (chisquare:12.788, $p<0.001$); 35 patients on Stage IIA patients did have a high tumour burden with 25 having stage T2b disease and 22 having an mSWAT greater than 10.

The ORR to first-line therapy was 73% for SDT and 57% for systemic treatments . $p=0.027$).

In SDTs, phototherapy was associated with slightly higher ORR (UVB 77%, PUVA 83%) compared to topical steroids (70%).

Lower ORR for topical steroids were particularly relevant for stage IIA (ORR: 29%) (chi-square :5.375, $p=0.020$ vsIA-IB) and T2b patients (ORR: 52%) (chisquare:4.581, $p=0.032$ with vs other T-classes).

A reduction which was statistically significant was seen in the median global Skindex-29 score between the first and the second evaluation (19.41, 95% CI: 14.29-27.62) ($p=0.006$). The reduction was confirmed for the subscales symptoms ($p=0.003$) and emotions ($p=0.008$) but not for functioning ($p=0.926$).

Discussion



Mycosis fungoides has slow evolution over years from patches to plaques (early-stage) and in some patient to tumors or erythroderma.

Folliculotropic mycosis fungoides (FMF) is generally poorly responsive to first-line SDTs and may run a more aggressive course.

FMF present with 2 distinct patterns, the early (follicle-based patch/flat plaques) and the advanced (folliclebased infiltrated plaques and/or tumors).

Good prognosis of early-stage FMF implies that these patients benefit from SDT.

In current study, first therapy was SDT in most patients (81.5%), although a minority received systemic therapy as their first therapy.

Conclusion

SDT was superior to systemic therapy even in patients with such disease characteristics y coses fungoides. Treatment for early-stage MF are not only based on stage, but also take into account presence of plaques, FMF disease and mSWAT; treatment outcomes such as ORR and progression to higher stages are adversely affected by these factors.

Reference:

Quaglino P et al. Treatment of early-stage mycosis fungoides: results from the PROspective Cutaneous Lymphoma International Prognostic Index (PROCLIPI) study. Br J Dermatol. 2020: 1-25.



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