

Does dermatoradiology exist?

Corrado Tagliati¹✉, Giulio Rizzetto², Elisa Molinelli², Edoardo De Simoni², Marco Fogante³, Giulia Argalia⁴, Giuseppe Lanni⁵, Alberto Rebonato⁶, Luca Burrioni⁴, Gian Marco Giuseppetti⁷, Giulio Argalia³, Annamaria Offidani², Oriana Simonetti²

¹Department of Radiology, AST Ancona, Ancona, Italy. ²Dermatology Clinic, Marche Polytechnic University, Ancona, Italy. ³Maternal–Child–Senological–Cardiological Radiology and Outpatient Ultrasound, Department of Radiological Sciences, Marche University Hospital, Ancona, Italy. ⁴Nuclear Medicine, Department of Radiological Sciences, Marche University Hospital, Ancona, Italy. ⁵Department of Services, U.O.S.D. Radiology, San Liberatore Hospital, Teramo Local Health Authority, Teramo, Italy. ⁶Radiology, AST Pesaro Urbino, Pesaro, Italy. ⁷Radiology, Medical Point, Ancona, Italy.

Keywords: clinical dermatology, clinicopathologic correlation, connective tissue, diagnosis, tumor

Received: 8 May 2024 | Returned for modification: 4 June 2024 | Accepted: 5 June 2024

To the Editor,

We would like to express our thoughts about ultrasound in dermatology and about the interconnections between dermatology and radiology in actual daily clinical practice.

Decades ago, dermatology and radiology seemed to be very distant specialties with few things in common. However, today technological advancements, particularly ultra high-frequency ultrasound, mean that dermatologists and radiologists are working for the same patients more frequently. This will become increasingly evident in the coming decades thanks to the future spread of new ultrasound technologies.

In recent years, high-frequency ultrasound has made it possible to evaluate the epidermis, dermis, and subcutis more clearly, and recently ultra high-frequency ultrasound has permitted better assessment of skin diseases and improved monitoring of dermatological treatments thanks to its high axial spatial resolution (1, 2). Currently, the contribution of ultrasound to the daily work of dermatologists and the number of applications of and publications about ultrasound in dermatological conditions are extremely high. In fact, Ximena Wortsman stated that dermatologic ultrasound is a new imaging subspecialty (3). However, sometimes ultrasound alone is not enough.

Magnetic resonance imaging can evaluate the extension of a skin disease to deeper tissues—for example, to assess subcutis, fascia, and muscle involvement in morphea-like or scleroderma-like lesions, or to evaluate associated muscular and/or skeletal involvement in cases of vascular malformations, such as capillary-venous ones (4, 5). Moreover, when a large or quickly growing adipose subcutaneous lesion is found with ultrasonography, magnetic resonance imaging needs to be performed to better assess the lesion in its entirety.

Positron emission tomography can be performed to identify metastases in cases of neoplasms already confirmed, such as melanoma, cutaneous squamous cell carcinoma, and Merkel cell carcinoma, or to determine the most metabolically active portion of a lesion and therefore help guide biopsy, such as in suspected liposarcomas (6). Moreover, positron emission tomography can be used to evaluate the response of Kaposi's sarcoma to highly active antiretroviral therapy, sometimes in association with chemotherapy (7).

Paraneoplastic dermatoses such as paraneoplastic pemphigus could take advantage of performing a thoracoabdominal computed tomography examination or a positron emission tomography

with the aim of identifying particularly associated neoplasms (8, 9). Moreover, Tc-99m methylene diphosphonate whole-body bone scan, single-photon emission tomography, and non-contrast computed tomography could be used to better quantify the extension of diffuse calcium skin deposits in dermatomyositis, and chest computed tomography can evaluate associated interstitial lung disease (10–12).

X-ray almost never can evaluate the skin, apart from cases with calcinosis cutis or large soft tissue masses. However, it can assess skeletal abnormalities associated with dermatological diseases, such as in Buschke–Ollendorff or McCune–Albright syndromes (13, 14). What is more, new treatments such as biologics determine that patients need to undergo at least a chest X-ray before starting these drugs to exclude active tuberculosis, particularly in cases of positive purified protein derivative readings or interferon gamma release assay (15).

Therefore, dermatology and radiology are already connected, and they will be increasingly linked to each other. It is important to say that dermatoradiology could be considered a new radiology subspecialty, and that radiology needs to apply themselves more to dermatological diseases: dermatology patients deserve further radiological attention.

Dermatological diseases are not only diseases of the skin. Many internal pathologies are strictly related to dermatosis. It is very important that radiologists know more about dermatologic affections so that they can answer better clinical question of the referring physician. In fact, there are many dermatologic diseases in which a radiologist could be asked to perform an ultrasound, a computed tomography examination, magnetic resonance imaging, an X-ray examination, or a positron emission tomography examination.

As always, the better radiologists know the patient's disease, the better they can answer clinical question of the referring physician. We think that every tertiary dermatology center should have a radiologist subspecialized in dermatoradiology. In our experience, teamwork is necessary to ensure that radiologists are aware of the importance of dermatologists' questions when a patient undergoes a radiological examination.

Therefore, it is important that a radiologist works inside a dermatology department as part of a dermatology team, or that he or she works in a radiology department while maintaining close contacts with dermatologists—for example, with meetings on a weekly basis. Moreover, we do think that it is important that radiology residents can choose to deepen their knowledge and expertise of

✉ Corresponding author: corrado.tagliati@gmail.com

dermatologic diseases and their radiological implications in order to establish better collaboration between these two medical specialties in the near future, thus allowing better treatment and management of dermatology patients. Therefore, we think that dermatoradiology exists and that it is time to start talking about this new radiology subspecialty.

We would like to encourage the International Society of Radiology, the Inter-American College of Radiology, the Pan Arab Association of Radiological Societies, the African Society of Radiology, the European Society of Radiology, the Asian Oceanian Society of Radiology, and other transnational radiological societies to start thinking about this new subspecialty for a better future and

we would like to encourage national radiological societies to engage in open, frequent, and productive discussions about these themes. This will allow many radiologists to deal with these topics during face-to-face meetings, on-line meetings, on-line lectures, distance and continuing education courses, and national and international congresses. We believe this is necessary to achieve the best dermatology patient management.

In conclusion, we agree that dermatologic ultrasound is a new ultrasound subspecialty and a new dermatologic imaging subspecialty; moreover, we think that dermatoradiology should be a new radiology subspecialty.

References

1. Wortsman X. Top applications of dermatologic ultrasonography that can modify management. *Ultrasonography*. 2023;42:183–202.
2. Mlosek RK, Migda B, Migda M. High-frequency ultrasound in the 21st century. *J Ultrason*. 2021;20:e233–41.
3. Wortsman X. A new imaging subspecialty, dermatologic ultrasound: letter to editor. *Semin Ultrasound CT MR*. 2023;So887.
4. Giannoni M, Rizzetto G, Diotallevi F, Molinelli E, Radi G, Campanati A, et al. Atypical scleroderma-like chronic GVHD in a liver transplant patient, clinical and MRI correlations. *Acta Dermatovenerol Croat*. 2022;30:123–5.
5. Schicchi N, Tagliati C, Agliata G, Esposito Pirani P, Spadari R, Giovagnoni A. MRI evaluation of peripheral vascular anomalies using time-resolved imaging of contrast kinetics (TRICKS) sequence. *Radiol Med*. 2018;123:563–71.
6. Fine GC, Covington MF, Koppula BR, Salem AE, Wiggins RH, Hoffman JM, et al. PET-CT in clinical adult oncology-VI. Primary cutaneous cancer, sarcomas and neuroendocrine tumors. *Cancers (Basel)*. 2022;14:2835.
7. Morooka M, Ito K, Kubota K, Minamimoto R, Shida Y, Hasuo K, et al. Whole-body 18F-fluorodeoxyglucose positron emission tomography/computed tomography images before and after chemotherapy for Kaposi sarcoma and highly active antiretrovirus therapy. *Jpn J Radiol*. 2010;28:759–62.
8. Tagliati C, Rizzetto G, Lanni G, Marcucci M, Argalia G, Lucidi Pressanti G, et al. Thoracoabdominal computed tomography neoplasia detection in patients with paraneoplastic pemphigus: the importance of collaboration between specialists. *Acta Dermatovenerol Alp Pannonica Adriat*. 2022;31:1–5.
9. Zheng J, Yang Y, Ke H, Qian R, Liu Z, Miao W. Clinical value of [18F]F-FDG PET/CT in patients with suspected paraneoplastic dermatoses: diagnostic performance and impact on clinical management. *Eur J Radiol*. 2023;169:111170.
10. Cervantes BA, Gowda P, Rider LG, Miller FW, Chen MY, Schiffenbauer A. Development of a computed tomography calcium scoring technique for assessing calcinosis distribution, pattern and burden in dermatomyositis. *Rheumatology (Oxford)*. 2024;63:58–63.
11. Patro PSS, Patra S, Kumar R, Agrawal K, Parida GK. Assessment of treatment response by bone SPECT-CT in a case of dermatomyositis with calcinosis cutis. *Indian J Nucl Med*. 2022;37:71–3.
12. Hu Q, Huang KC, Goh CH, Tsuchiya Y, Liu Y, Qiu H. Characteristics and risk of interstitial lung disease in dermatomyositis and polymyositis: a retrospective cohort study in Japan. *Sci Rep*. 2023;13:17172.
13. Diotallevi F, Simonetti O, Radi G, Martina E, Paolinelli M, Sapigni C, et al. Buschke–Ollendorff syndrome in a 6-year-old patient: clinical and histopathological aspects of a rare disease. *Acta Dermatovenerol Alp Pannonica Adriat*. 2020;29:31–3.
14. Lew PP, Ngai SS, Hamidi R, Cho JK, Birnbaum RA, Peng DH, et al. Imaging of disorders affecting the bone and skin. *Radiographics*. 2014;34:197–216.
15. Hewitt RJ, Francis M, Singanayagam A, Kon OM. Screening tests for tuberculosis before starting biological therapy. *BMJ*. 2015;350:h1060.