

The rheumatologist's time machine

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Editorial

Rheumatology is the branch of criteria; as in most cases we always look for a mix of disease elements including symptoms, signs, laboratory, and radiographic finding putting them together in a criteria to have the diagnosis.¹ But the process of criteria collection to establish a defined clear diagnosis is not always that easy, because of the similarity of multiple patients symptoms and signs, the late completion of clinical picture where some diseases may take years to give us the complete typical clinical picture, plus the lack of pathognomonic laboratory tests in most cases, and the delayed appearance of specific radiographic finding; such factors usually result in a time gap between the start of patients complain to established diagnosis.¹ In the last few decades with better understanding of pathophysiology of many rheumatological disorders and the development of many advanced therapeutic agents with effective treatment protocols, the demands for early patient diagnosis and intervention became on the top of our priorities; but still we are in need for a valuable objective evidence which should be significant enough for us to expose the patient to early treatment intervention.¹

So closure of time gap between the start of patients complain, established diagnosis and early intervention is always our ideal dream that's for we may wish to have a time machine that can take us forward through the patients joints to get pathological signs as early as its beginning and so we soon can implement our treatment protocols to save the joints as much as we can. With the development of musculoskeletal ultrasound (MSUS) especially with the high end machines and its introduction in the field of rheumatology; the rheumatologist actually got his time machine. MSUS can simply take the rheumatologist from bedsides to the deep inside of joints; in a real journey between all joint areas: tendons, ligaments, cartilage, synovium, vessels, nerves, and even bone cortex. During this journey, he/she can see them in real time during resting, moving, contracting, and relaxing. He/she can look all around the joints defining its vascularity, elasticity and density.²⁻⁴ In rheumatoid arthritis MSUS can detect many articular pathological lesions including: joint synovitis and its blood flow as early as patients complain start and even though in many subclinical cases; Bony erosions especially in early rheumatoid arthritis with 6.5 more sensitivity that conventional radiography; plus the joint effusion and tenosynovitis.⁵⁻⁹

MSUS is ideal to detect early crystal deposits in the hyaline cartilage of synovial joints due its reflection properties and by its highly specific site of deposition we can differentiate the superficial urate deposits of gout from the deep intracartilagenous of calcium pyrophosphate deposits.¹⁰

The hallmark of spondyloarthropathy (SPA), is the entheses organ. MSUS is the only available imaging tool that can assess the all components of entheses including the soft tissue part either tendon, or ligament; the bony insertion line, the related bursa, and the blood flow inside. In many research studies in SPA MSUS appears to be efficiently able to detect early enthesitis even at subclinical level.^{11,12}

MSUS can assess the homogeneity, and clarity of hyaline cartilage.

It clearly defines the cartilage synovial interface and the deep layer of hyaline cartilage from the subchondral bone. In early osteoarthritis MSUS can detect cartilage erosions, loss of clarity, and loss of thickness as early as the cartilage degeneration starts.^{13,14} Beyond the early diagnosis, MSUS can simply assess the articular response to treatment as early as two weeks from start of treatment and can guide the rheumatologist hand to actual placement of intra articular medications.^{15,16}

Away from the joints, ultrasound can help the rheumatologist in many extra articular regions. The detection of Halo sign in temporal artery can replace the biopsy and aids the efficient diagnosis of temporal arteritis. Furthermore, ultrasound evaluation of the skin in scleroderma can enhance the early diagnosis and improve the efficacy of treatment follow up.^{17,18} Ultrasound can replace both the scintigraphy and biopsy in the assessment of salivary gland inflammation. It can evaluate the gland homogeneity, echogenicity, blood flow, and fibrosis; which considered not only a useful very simple valid tool to detect early glandular involvement in many connective tissue diseases, but also can differentiate acute active from old chronic involvements.^{18,19} Pulmonary involvement frequently encountered in a wide range of connective tissue diseases, ultrasound can accurately early detect the pleural effusion, pulmonary fibrosis, and even the mediastinal lymph nodes.^{20,21}

So there is no doubt that the rheumatologist can use the ultrasound machine as a time machine to close the time gap between patient complain and diagnosis, but as with dealing with any other machines the one should be efficiently trained to use otherwise it may be dangerous and harmful to use it. So is the ultrasound machine it is very useful in the trained hand, and harmful with non-trained operator giving a lot of wrongful information.

Now the matter is yours. It's possible now to use the time machine to help your patients a lot but you need to endorse more time and

effort to know first the basic knowledge about the normal sonographic definition, basic scanning techniques, and multiple hands on training on normal, the sonographic definition of pathological lesions, and supervised hands on scanning on patients.²² Finally the machine is yours but you need to know how to efficiently drive before you go.

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None.

Conflicts of interest

None.

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