



PRELIMINARY DATA ON THE ROLE OF CONTRAST ENHANCED ULTRASOUND (CEUS) IN EARLY DIAGNOSIS AND STAGING OF RHEUMATOID ARTHRITIS

Trapanese Ersilio¹ | Scognamiglio Umberto² | Amato Patrizia³ | * Tarro Giulio⁴

¹ Interventional Ultrasound of Breast - ASL Salerno Italy.

² Interventional Ultrasound in infectious diseases departement - D.Cotugno Hospital Naples Italy.

³ MD, Rheumatologist - ASL Salerno Italy.

⁴ Emeritus Professor: President Foundation de Beaumont Bonelli for Cancer Research Naples Italy. (*Corresponding Author)

ABSTRACT

This paper is concerning with Rheumatoid Arthritis (RA) and the use of CEUS in the diagnosis and staging of the disease. 51 patients were studied for this clinical symptoms, radiology and biomarkers. The contrast enhanced ultrasound allows to establish an early diagnosis and staging of RA by monitoring the vascular progression of the synovial membrane. There are good perspectives for further confirmation of the methodology.

KEYWORDS: Rheumatoid arthritis, CEUS, biomarkers.

Introduction

The aim of the study is to evaluate the role of ultrasonography with contrast enhanced ultrasound (CEUS) (Chang et al., 2014) in the early identification of the inflammatory process to the wrists (Damjanovic et al., 2012) and its involvement in the staging of rheumatoid and psoriatic arthritis. The joints of the hand can be place for several disease processes ranging from osteoarthritis to the various forms of arthritis, with mild arthralgia to severe deformation with consequences, cause of disability (Gibofsky, 2016). Rheumatoid arthritis (RA) is a chronic autoimmune disease (Altucci and Tarro, 2014) characterized by systemic inflammation and joint damage (Tarro and Altucci, 2014), which affects about 1% of the population (Rossini et al., 2014). The earlier and frequently affected joints are the metacarpophalangeal (Kyburj et al., 2006) and proximal interphalangeal (Frisell et al., 2014). The detection of alterations in these joints can be considered index of spreading joint damage. The possibility of early identification of a rheumatoid arthritis (Berghin et al., 2006) by settling the type and level of activity (Li et al., 2014), can allow to set an appropriate therapy (Kyburj et al., 2011), to monitor it in the long run and therefore to prevent the damage caused by blocking its developing disease.

Materials and Methods:

From January 2014 to December 2015 51 consecutive patients were enrolled, 31 female and 20 male, caucasians, in which it was suspected, on the basis of symptomatic claims, the RA; subsequently laboratory (Dessein et al., 2004) and instrumental tests (Pincus, 2008; You et al., 2014) were performed for routine diagnosis. Each patient was then subjected to CEUS using 2.2 MI of SonoVue (Bracco) (Westwood et al., 2013) and using high frequency linear probes (13-15 MHz) (Toshiba Aplio XG) (Arit et al., 2016).

All patients were monitored for 12 months after the first examination on a quarterly follow-up.

Results and Discussion:

Fourteen of 51 patients showing classical symptoms for RA were seronegative (Dai et al., 2010) and without any instrumental findings (Rx-NMR) indicative for the disease (see table). At CEUS 10/14 showed a contrastographic behavior characterized by a hypervascular appearance of the synovial membrane (SM) with the linear microbubble perfusion, uniform and constant, we have called this behavior "Linear pattern" consistent with an early stage of the disease when the anatomy of the capillary arterial vessel of SM is kept normal (De Zordo et al., 2007; Forshind et al., 2004). These patients had no obvious serological and instrumental alteration. During follow-up 9 of these 10 patients experienced instrumental changes that have allowed us to make the diagnosis of RA. 37/51 patients showed laboratory abnormalities and instrumental characteristics of the RA. In these patients CEUS showed a different contrast enhancement behavior depending on the degree of disease progression: In 16/37 at CEUS it is highlighted the presence of new vessels at the SM spaced and dilated. (Pattern defined Iso-enhancement). These patients showed serological changes but no changes to the XR and conventional NMR. In 21/37 patients showing signs of advanced instrumental changes for RA at the NMR, it was evident at CEUS a slow and incomplete hypovascular enhancement with large areas of the SM related to fibrotic and calcified areas, (Pattern defined Ipo-enhancement). These preliminary data show the role of CEUS in the early diagnosis and staging of the RA (Hartung et al., 2007; Skrdularek et al., 2003): we are looking for further data

and statistical analysis to evaluate the sensitivity and specificity of the method.

Acknowledgments:

The authors thank for their support: Foundation T & L De Beaumont Bonelli for Cancer Research Naples - Italy & University Hospital OO.RR. San Giovanni di Dio Ruggi d'Aragona - Medical School Salerno - Salerno - Italy.

Tables and figures:

Table- Monitoring of Patients with Rheumatoid Arthritis					
Patients Number	Sub Category	Clinical Signs	Serum Markers	XR & NMR Signals	CEUS Methodology
37		Present	Positive	Various	Progressive
	21	Present	Positive	Advanced	Ipo-enhancement
	16	Present	Positive	Not Clear	Iso-enhancement
14		Present	Negative	Absent	See below
	10	Present	Negative	Absent	Linear pattern
	9	Present	Positive	present	Confirmed

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