CASE REPORT

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mDIXON Quant MRI Findings of Breast Myofibroblastoma

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Abstract

The mDIXON quant sequence is a chemical shift encoding based on the proton density fat fraction, which can assess fat content quantitatively. Myofibroblastoma (MFB) is a benign mesenchymal entity, and its prevalence is less than 1% of all breast tumors. Since MFB includes variable amounts of fat-containing fascicles, the mDIXON quant sequence provides a prominent contribution in evaluating fat content in the lesion.

**Keywords:** Breast, myofibroblastoma, mDIXON quant, magnetic resonance imaging

INTRODUCTION

Myofibroblastoma (MFB) is a benign mesenchymal entity. It is a rare tumor with a prevalence of less than 1% of all breast tumors.[1] It is more common in postmenopausal women and middle- to older men. Although its etiology has not been fully understood, cases with a history of steroid hormone use, gynecomastia, chest wall trauma, and surgical scars have been reported in the literature.[2] Although MFB is a benign entity, in radiological evaluation, there is no specific diagnostic feature[3]. The mDIXON quant sequence is a chemical shift encoding based on proton density fat fraction, which can assess fat content quantitatively with fat fraction value.[4] In this case report, we present the mDIXON quant magnetic resonance imaging (MRI) findings of MFB. To the best of our knowledge, this is the first case presenting mDIXON quant MRI findings of MFB in the published literature.

CASE PRESENTATION

A 55-year-old male patient with a complaint of abdominal pain underwent abdominal MRI. Although he had no history of cancer in his own and family history, he had a subcutaneous lipoma at the lower thoracic levels on the right anterior axillary line for a long time. An abdominal MRI examination included upper extraabdominal sites up to the retroaerolar region. In this examination, there were solid lesions in both retroareolar areas. The most significant lesion was located at the left retroareolar localization (Figure 1A, B). In our institute, routine abdominal MRI protocol includes another sequence called mDIXON quant, showing macroscopic-microscopic fat and water content (Figure 2). In the macroscopic fat content measurements with the lesion's largest diameter, the lesion contained 22.51% fat, and the lesion T2
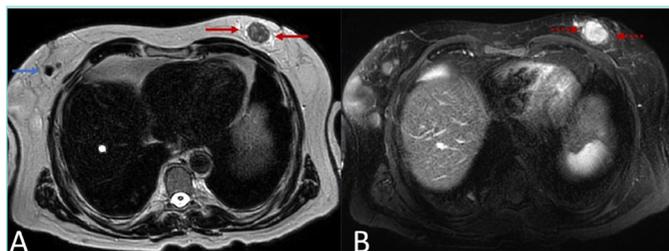
Figure 1. Solid lesion located at the left retro areolar localization was inhomogeneous; on T2-weighted images (A), it was hypointense, and there were hyperintense areas in the lesion (red arrows). Also, smaller solid lesions were detected in the right retro areolar area (blue arrows). On fat-saturated T2-weighted (spectral presaturation with inversion recovery) sequence (B), the lesion was hyperintense. There was no signal suppression due to any fat content (dashed red arrows).

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relaxation time was measured as 82.03 ms (Figure 3A, B). In the coloured maps created in the section that passed through the lesion level, the percentage of fat contained in the lesion was shown in the appropriate color (Figure 3C, D). Mammography and breast ultrasonography were recommended for further examination. The left retroareolar solid lesion
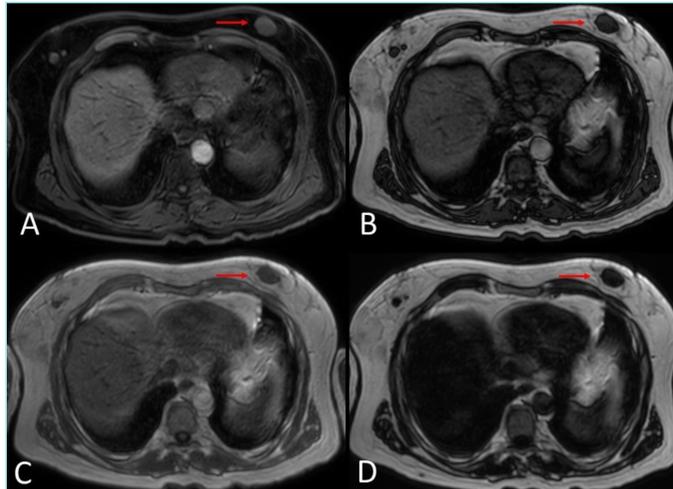
Figure 2. In the mDIXON Quant sequence, the lesion (red arrow) was hyperintense in the water only images (A) and hypointense in in-phase (C) and out-phase (B) images. In fat only images (D), hypointense and hyperintense areas show macroscopic fat content in the lesion.
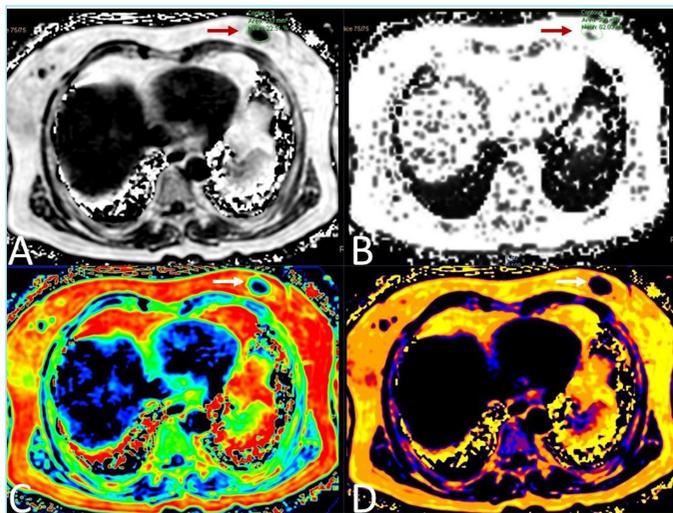
Figure 3. Quantification of fat with the largest diameter of the lesion (red arrow), the lesion contains 22.51% fat (A), and lesion T2 relaxation time was measured as 82.03 ms (B). In the measurements made at the workstation on the mDixon quant sequence images, the quantification of fat can be made numerically. The fat content can be visually understood by looking at the scale consisting of the colors assigned to the percentage ranges. Here, as in the C and D figures, two different color scales can be used. In (C), fat-rich areas are shown in red, poor areas in dark blue. In (D), fat-rich areas are bright yellow, while areas poor in oil are identified in black. The lesion was marked with white arrows, which corresponds to 22.51% fat content; Green and blue in (C) and purple and black in (D) were assigned to the lesion by the program.

was excised because of breast evaluation. Histopathological diagnosis of the lesion has been reported as (MFB) (Figure 4).

DISCUSSION

MFB belongs to the family of CD34-positive tumors and is characterized by spindle-shaped cells growing in collagen bands and variable numbers of fat-containing fascicles.[3]

The mDIXON quant sequence is a proton-density-based chemical shift encoding that uses a fat fraction value to quantitatively analyze fat content.[4] This sequence consists of four separate series: in-phase, out-phase, water only, and fat only, using mathematical calculations taking advantage of the $T2^*$ relaxation time difference of fat and water. In this way, it is possible to make fat rate measurements that give meaningful results in different organs and lesions using this sequence, which is generally used in the abdominal region.[5]

Because MFB is a rare disease and includes variable amounts of fat-containing fascicles, the mDIXON quant sequence provides a prominent contribution in evaluating fat content in the lesion. By using this sequence, quantification of fat can be made. Additionally, this sequence provides us with better management in the evaluation and treatment of similar lesions. Written informed consent was obtained from the patient who participated in this study.

MAIN POINTS

- The mDIXON quant sequence is a chemical shift encoding based on proton density fat fraction, which can assess fat content quantitatively with fat fraction value.

- It is possible to make fat rate measurements that give meaningful results in different organs and lesions using the mDIXON sequence, which is generally used in the abdominal region.

- Because MFB is a rare disease and includes variable amounts of fat-containing fascicles, the mDIXON quant sequence provides a prominent contribution in evaluating fat content in the lesion.
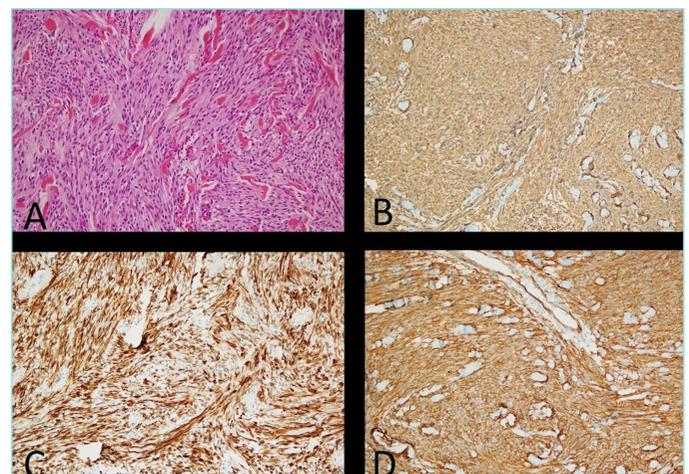
Figure 4. The tumor shows uniform spindle cells growing in fascicles with intervening bands of ropey collagen (A) (hematoxylin and eosin, x200). In immunohistochemical analysis, the tumor cells show diffuse and robust positive staining [(B) vimentin, (C) desmin, and (D) CD34 (x200)].

- The mDIXON sequence provides us with better management in the evaluation and treatment of similar lesions.

ETHICS

Informed Consent: Written informed consent was obtained from the patient who participated in this study.

Peer-review: Externally and internally peer-reviewed.

Authorship Contributions

Concept: H.A.Ö., Design: I.B.A., C.A., M.G.D., Supervision: I.B.A., P.B., Fundings: H.A.Ö., M.G.D., Materials: I.B.A., M.G.D., Data Collection and/or Processing: H.A.Ö., M.G.D., Analysis and/or Interpretation: I.B.A., Literature Search: C.A., P.B., Writing: H.A.Ö., C.A., P.B., Critical Review: C.A., P.B.

DISCLOSURES

Conflict of Interest: The authors have no conflicts of interest to declare.

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