

Calcium Aspartate Anhydrous for Increasing Knee Cartilage Volumes in Arthritis Patients: New Evidence

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Introduction

Magnetic Resonance Imaging (MRI) was used to investigate structural changes to hyaline cartilage in arthritis patients using calcium aspartate anhydrous (CaAA).

Aims and Objectives

To quantify femoral, tibial and patellar cartilage volume changes over a period of one year in patient volunteers using calcium aspartate anhydrous (CaAA) to enhance Type II collagen production and to treat osteoarthritis (OA) and rheumatoid arthritis (RA).

Methods

Ninety-three patients (48RA, 45OA) were selected for imaging following a clinical examination of their arthritis. They were then assigned to three groups: OA, RA and placebo. The OA group comprised 31 OA patients. Nineteen of them were male (age range 55-73, mean 63 years) and 12 were female (age range 54-75, mean 64 years). The RA group had 31 RA patients. Fifteen were male (age range 52-69, mean 61 years) and 16 were female (age range 48-71, mean 58 years). The placebo group had 17 RA patients and 14 OA patients. 13 were male (age range 51-72, mean 62 years) and 18 were female (age range 50-73, mean 63 years).

Knee imaging was performed on a Siemens Impact clinical scanner (field strength 1.0T) using a 3D gradient-echo imaging sequence with fat suppression. Imaging parameters were TR/TE=50/11 (40° flip angle), allowing excitation of a 100mm slice block and generation of a series of 64 contiguous sagittal image slices each 1.56mm thick. Phase encoding was limited to 192 steps, and zero-filling was implemented to display the images on a 256x256 matrix (voxel resolution 0.55x0.55x1.56mm). The total imaging time was just over ten minutes. Imaging was performed on each patient knee at entry into the study, and subsequently at n, and 52 weeks (n=8, 16 or 24

weeks).

Patients in the OA and RA group were given 1000mg of calcium aspartate anhydrous (CaAA) three times a day for the period of one year. Patients in the placebo group received 1000mg powder that contains 5% calcium lactate pentahydrate three times a day for the same period.

Femoral, medial tibial, lateral tibial and patellar cartilage volumes were obtained by manual segmentation using a combination of inhouse software and commercial software (TOSCA, IBM). Qualitative progression was assessed by visual inspection of 3-D renditions using DX, IBM of the TOSCA segmentations.

Results

Qualitative assessments showed that all of the patient volunteers studied had cartilage lesions detectable by MRI. The number of compartments with cartilage lesions ranged from 2-4 affected compartments per individual (mean 3.3, median 3 for OA group, mean 3.4, median 4 for RA group, and mean 3.3, median 3 for Placebo group). Of the 93 individuals, 89 had cartilage lesions in the femoral condyle, 52 had lesions in the lateral tibial plateau; 46 had lesions in the medial tibial plateau, and 36 had lesions in the patella. In many cases each compartment had more than one distinct cartilage lesion, and lesions varied considerably in size.

Cartilage remodeling was evident in many of the patients in the OA and RA groups over the one-year study as demonstrated qualitatively by changes in the size and shape of the cartilage lesion. Both decreases and increases in cartilage lesion size were observed and shown in Table I.

86.27% in the OA group and 76.41% in the RA group had their cartilage lesion size reduced more or less during the year of using calcium aspartate anhydrous, as opposed to 16.5% in the placebo group. Only 2.94% and 3.77% in the OA and RA group respectively had their lesion size increased, vs. a total of 39.81% in the placebo group.

	Level of Lesion Size Change					Total # of Lesions
	Significantly Reduced	Moderately Reduced	No Change	Moderately Increased	Significantly Increased	
OA	27(26.47%)	61(59.80%)	11(10.78%)	3(2.94%)	0(0%)	102
RA	18(16.98%)	63(59.43%)	21(19.81%)	4(3.77%)	0(0%)	106
Placebo	2(1.94%)	15(14.56%)	45(43.69%)	32(31.07%)	9(8.74%)	103

Table I. Number of Cartilage Lesion Size Change for Different Groups

	Change of Knee Cartilage Volume ml				
	FEMUR	MED TIB	LAT TIB	PATELLA	TOTAL
OA-Male	254 ± 126	63 ± 33	57 ± 38	69 ± 53	443 ± 163
OA-Female	201 ± 153	53 ± 35	65 ± 32	62 ± 49	381 ± 198
RA-Male	213 ± 145	69 ± 28	61 ± 34	56 ± 61	399 ± 211
RA-Female	187 ± 102	62 ± 39	52 ± 36	42 ± 39	343 ± 128
Placebo-Male	-68 ± 103	-43 ± 51	15 ± 40	27 ± 43	-69 ± 131
Placebo-Female	-24 ± 97	-4 ± 25	-62 ± 32	18 ± 37	-72 ± 116

Table II. Average Change of Knee Cartilage Volume ± S.E.M. in the Various Knee Compartment

Quantitative measure of cartilage volume change showed that patients in the OA and RA groups had gained significant amount of cartilage.

Analysis of cartilage volume change in each compartment stratified for the three groups and different sex are shown in Table II.

The cartilage volume increases in the OA and RA groups are statistically significant.

Conclusion

This study demonstrated that patients with osteoarthritis or arthritis gained back significant volume in the knee cartilage and the size of their cartilage lesions had reduced while using Calcium Aspartate Anhydrous.

References

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