

### ABSTRACT

**Purpose:** In previous osteoarthritis (OA) studies performed on murine models displaying the heterozygous chondroplasia gene (cho/+) with a col11a1 mutation shown, Losartan showed reduced cartilage loss in the knee joint articular cartilage and the temporomandibular joint (TMJ) condylar (Osteoarthritis and Cartilage, 2019, 27; 676-686). This cross-sectional study examines the beneficial effect of losartan on patellar cartilage volume in patients with knee osteoarthritis.

**Methods:** We used data from the (OAI) to compare patellar cartilage volume in patients who were taking losartan. A total of 4796 men and women ages 45-79 years were enrolled into the OAI study who had knee osteoarthritis or who were at high risk of developing it. We focused on the progression sub-cohort, consisting of 1390 subjects who had documented osteoarthritis at three different periods: baseline, 12 and 24 months. Patients with missing data or those who were taking other angiotensin receptor blockers were excluded from our study. Patients were divided into the losartan group and the control group. Data sets for the analysis consisted of demographics, drug usage, along with magnetic resonance imaging (MRI) and patellar cartilage volume at each of the three time periods.

**Results:** Our analysis of the progression sub-cohort included a total of 85 (44 %) men and 108 (56 %) women with symptomatic knee OA (Total n=193). The average age of patients was 59.6 years (SD, 8.7 years; range, 45-79 years). The majority of the participants were Caucasian (n=142; 73.6 %) and African American (n=42; 21.8 %). Of the 193 patients included in analysis, 30 patients were taking losartan and remaining 163 patients were considered control group. Over the period of two years, there was a progressive decline in cartilage volume in both groups. Our analysis show that there was no significant loss of cartilage volume with patients on losartan over baseline at 12 (5 %) and 24 months (8 %) post enrollment. Patients without losartan showed significantly higher cartilage loss at 24 months post enrollment over baseline (~15 %, p<0.05).

**Conclusion:** This study found evidence that the use of losartan reduced the loss of patellar cartilage in patients with knee osteoarthritis.

### INTRODUCTION

- Osteoarthritis (OA) is the 11th highest contributor to disability globally and its prevalence is only increasing
- Risk factors for OA among many include increased age, obesity, joint injuries and lifestyle etc
- Available therapies are limited by their adverse effects or lack of significant effectiveness for either the prevention or treatment of OA
- TGF-β1 plays a critical role in the development of OA
- Losartan, an angiotensin II receptor antagonist, used for hypertension also blocks the TGF-β1 signaling pathway making it a candidate for the treatment of OA

### OBJECTIVES

- In previous OA studies performed on murine models displaying the heterozygous chondroplasia gene (cho/+) with col11a1 mutation, Losartan showed reduced cartilage loss in the knee joint articular cartilage and the temporomandibular joint (TMJ) condylar
- The purpose of this cross-sectional study was to explore the effects of Losartan on patellar cartilage volume in patients with knee OA.

### METHODS

#### Obtaining Data

- Data was obtained from the publicly available database, Osteoarthritis Initiative (OAI)
  - Demographics: age, sex, race (data file names: Clinical\_FNOH, Enrollees)
  - Patient drug usage (date file name: MIF00)
  - MRI data on cartilage volume (data file name: KMRI\_FNIH\_Qcart\_Biomediq00)

#### Study Group

- 4796 men and women between the ages of 45-79 were enrolled into the study primarily consisting of those with known knee OA or those at a high risk of developing knee OA
  - Focus was on the progression sub-cohort, consisting of 1390 subjects
- Patients with missing data or those taking other angiotensin receptor blocker drugs were excluded from analysis

#### Research Design

- Extracted MRI data from the OAI database at three observed measurement periods:
  - Baseline, 12 months, and 24 months post enrollment
- Patients were divided into two groups to undergo further investigation
  - Losartan group (n=36)
  - Control group (patients not taking losartan) (n=163)
- Data on cartilage volume at the knee joint was compiled and compared across treatment groups

### RESULTS

- In both groups there was a progressive decline in cartilage volume over the period of two years in both treatment groups.
- Over a period of 2 years there was no significant change in cartilage volume in patients who were taking losartan.
- Significantly lower cartilage volume was found in patients who were not on losartan over baseline post 24 months of enrollment

Subject Characteristics	n	%	Mean	SD	Median	Range
Age (years)			59.6	8.7	59	45-78
Gender						
Male	85	44				
Female	108	56				
Race						
White	142	73.6				
Black or African American	42	21.8				
Asian	2	1.04				
Other Non-white	7	3.63				

### DISCUSSION AND CONCLUSION

- Overall, this study suggests that losartan reduces the loss of patellar cartilage volume in patients with knee OA.
- It appears that losartan prevents or lowers cartilage loss.
- Adjunctive treatment of losartan in patients suffering from osteoarthritis could be helpful in preventing/lowering progression of osteoarthritis.
- Limitation of this study is that prior to enrollment patient drug history is unknown.
- Further analysis is needed to confirm the association of losartan and reduced cartilage volume along with the beneficial effects of losartan in OA.

### REFERENCE

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