

# Sodium-dependent glucose transporter 2 inhibitor alleviates renal lipid deposition and improves renal oxygenation levels in newly diagnosed type 2 diabetes mellitus patients: a randomized controlled trial

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## Introduction

- Sodium-dependent glucose transporter 2 inhibitor (SGLT2i) demonstrated excellent renoprotective effects while improving blood glucose in type 2 diabetes mellitus (T2DM) patients.
- The purpose of our study was to evaluate the effect of cagliflozin on intrarenal lipid content and oxygenation in patients with newly diagnosed T2DM.

## Methods

- 64 patients newly diagnosed T2DM with normal renal function were randomized into the caglitazone (n = 33) and the glimepiride control (n = 31).
- Intrarenal lipid content and oxygenation levels were assayed by functional magnetic resonance imaging scanning.
- The relationship between body mass index and intrarenal lipid content in T2DM patients were analyzed and the correlation between changes in intrarenal lipid content and improvements in renal hypoxia were further assessed.

## Results

- Canagliflozin group decreased more of body weight, and blood uric acid level compared with glimepiride group (all  $P < 0.05$ ).
- The intrarenal lipid content could be significantly reduced after canagliflozin treatment for 24 weeks (Figure 1).
- The  $R2^*$  values, a parameter for quantifying the oxygen content in tissues and is inversely related to the oxygen content, of the renal cortex and medulla in the canagliflozin group decreased from the baseline by 6.40% ( $P < 0.01$ ) and 12.09% ( $P = 0.000007$ ), respectively (Figure 2 and 3).
- The degree of reduction of fat fraction ( $\Delta FF$ ) in the kidneys of the canagliflozin group was correlated with the degree of improvement of oxygenation level ( $\Delta R2^*$ ) in the renal cortex ( $r = 0.422$ ,  $P = 0.014$ ) (Figure 4).

## Discussion

- Studies have shown that renal FF values are increased in subjects with T2DM compared to subjects without T2DM<sup>1,2</sup>.
- SGLT2i therapy reduces renal oxygen consumption by lowering GFR and directly inhibiting SGLT2-mediated proximal tubular reabsorption of sodium reabsorption to decrease renal oxygen consumption and reduce hypoxic stress, improving renal outcomes<sup>3</sup>.

## Conclusion

- The early nephroprotective effect of SGLT2i in patients with newly diagnosed T2DM may be partly attributed to improved renal hypoxia by alleviating renal lipid deposition.

## References

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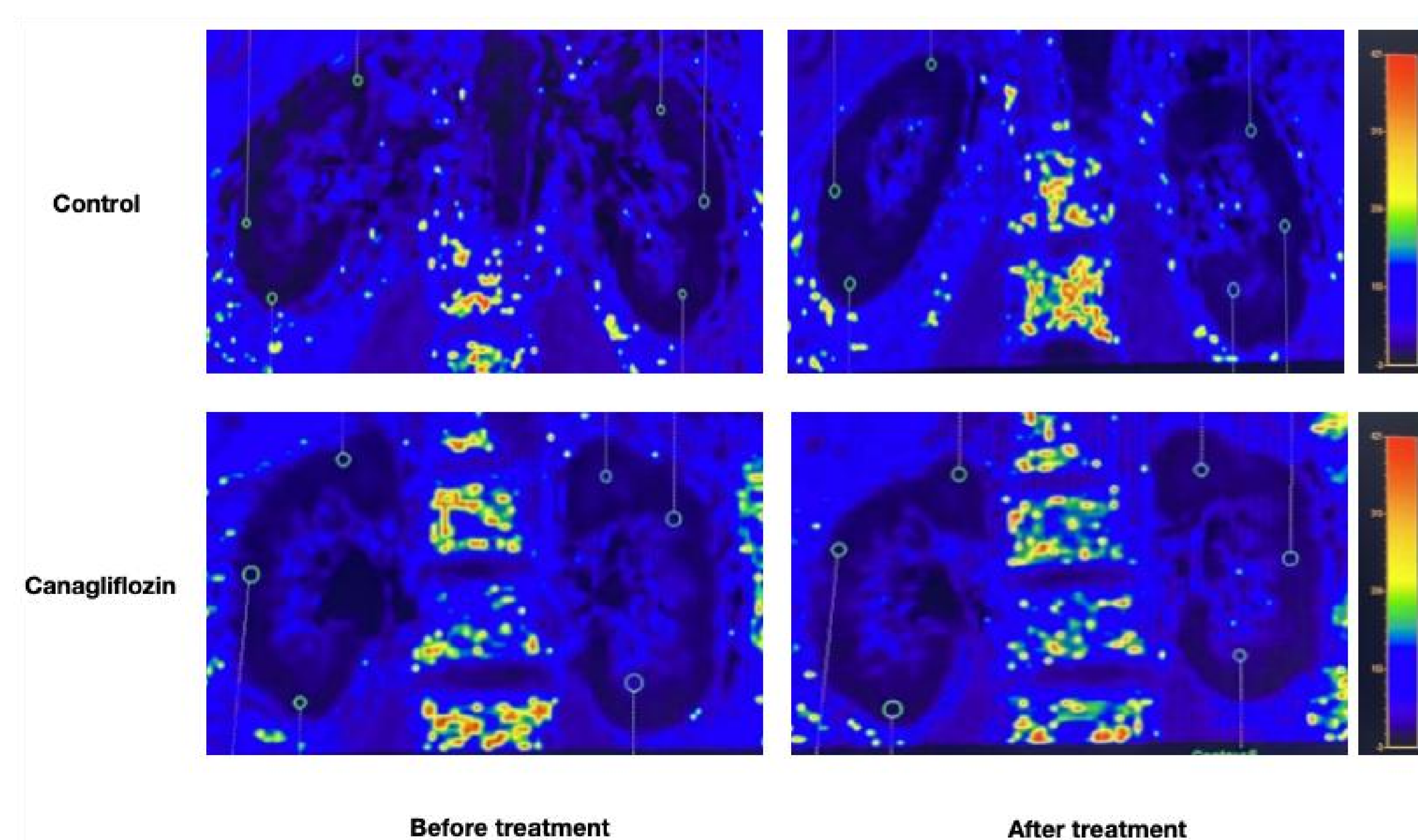


Figure 1

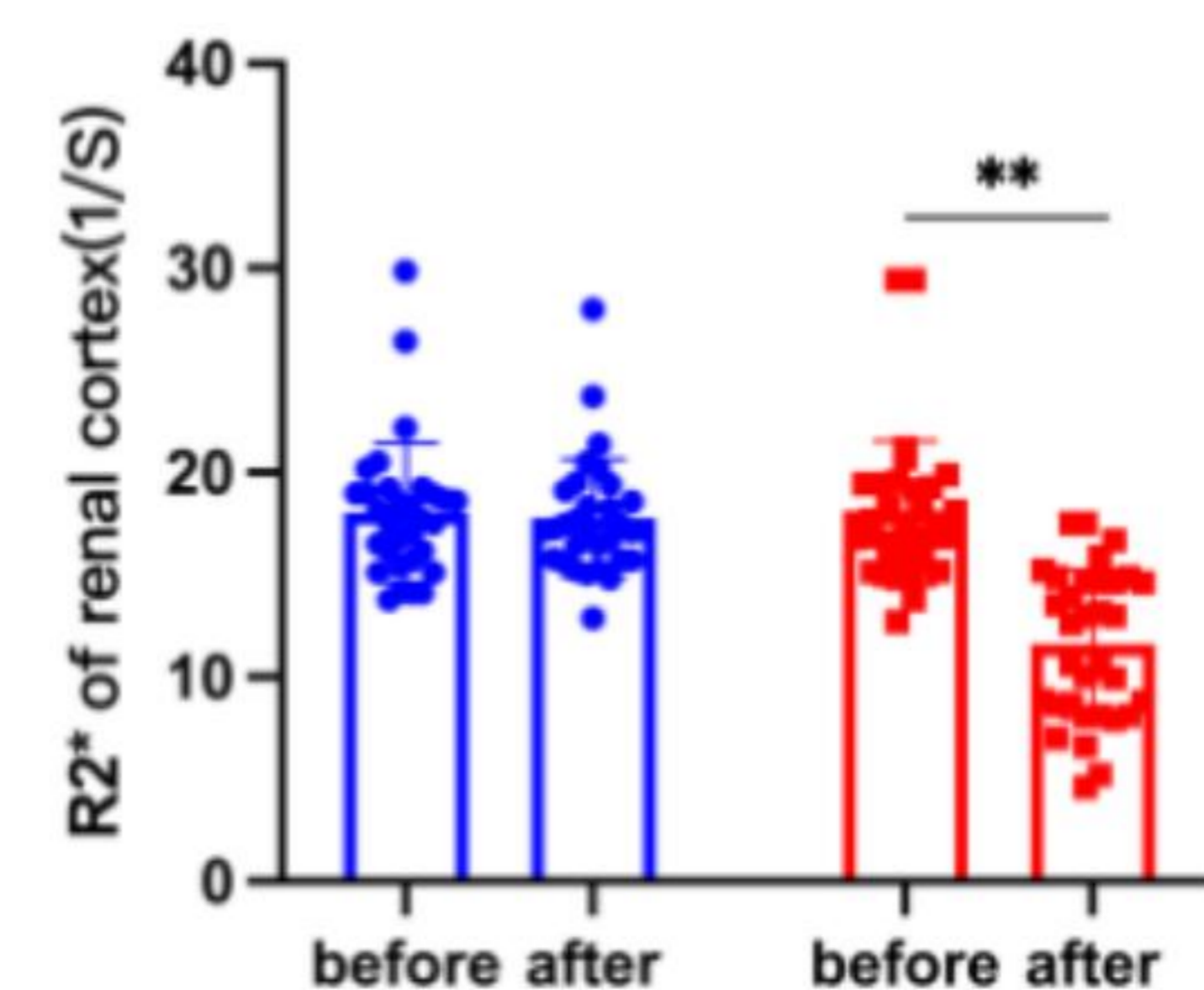


Figure 2

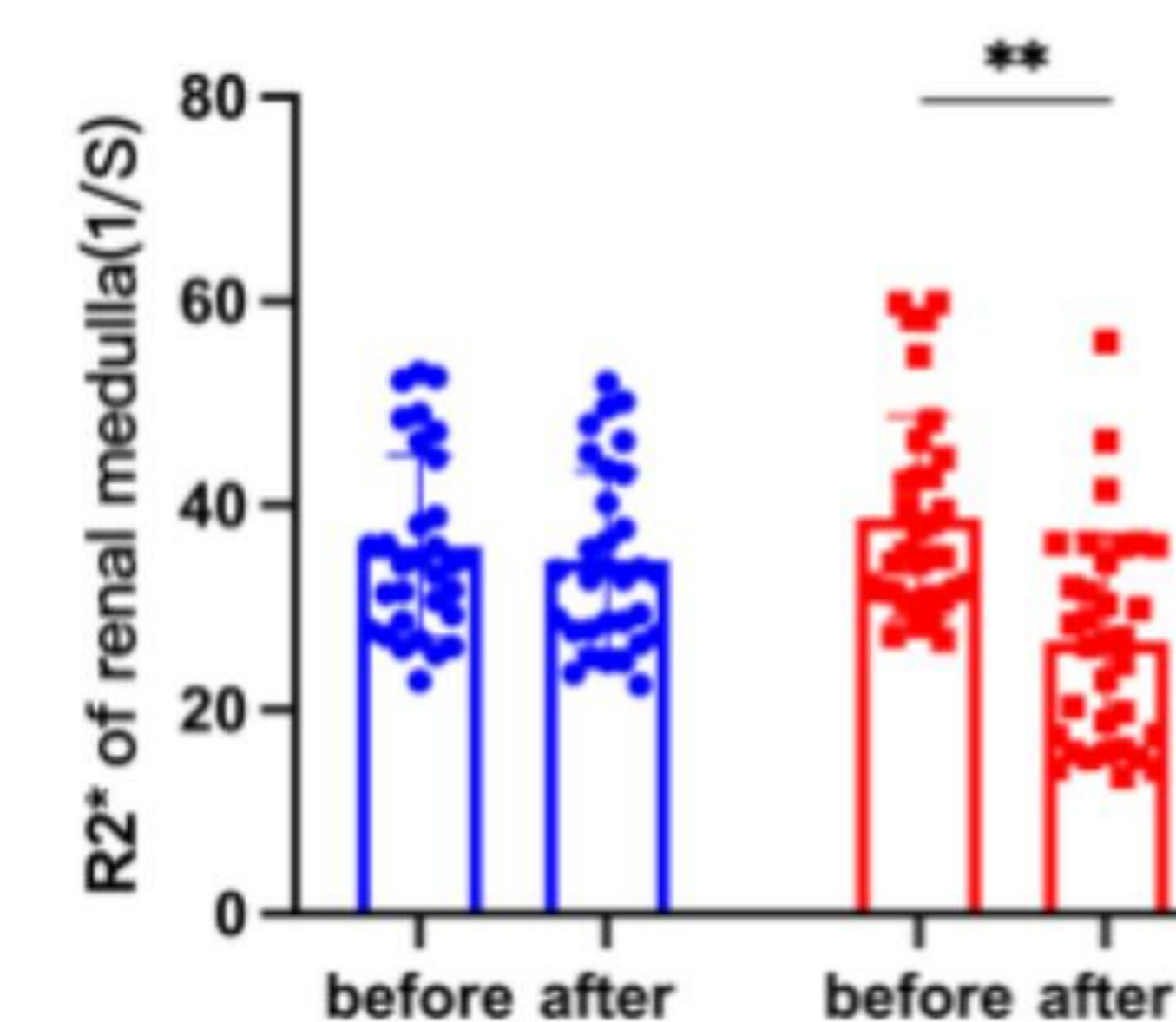


Figure 3

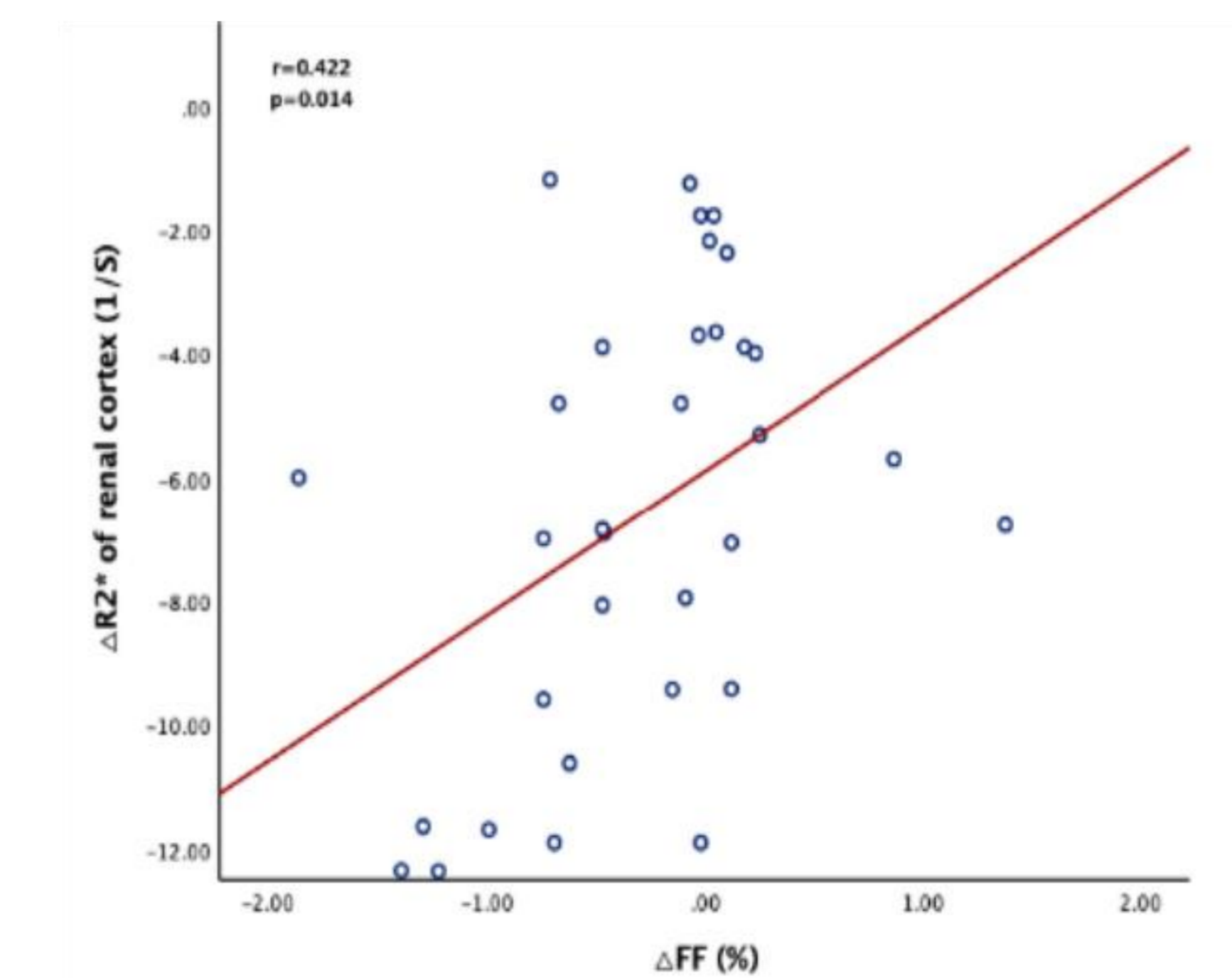


Figure 4