

## Management of Nephrotic Syndrome Through the Use of ACTH: A Systematic Review

Ronith Chakraborty<sup>1</sup>, **Nikhil Nair**<sup>2</sup>, Lena Nemer<sup>3</sup>, Jayadev Joshi<sup>4</sup>, Rupesh Raina<sup>1,5</sup>

<sup>1</sup>Department of Nephrology, Cleveland Clinic Akron General/Akron Nephrology Associates, Akron, OH, USA

<sup>2</sup>Case Western Reserve University, Cleveland, OH, USA

<sup>3</sup>Firestone High School, Akron, OH, USA

<sup>4</sup>Department of Quantitative Health Sciences, Cleveland Clinic, Cleveland, OH, USA

<sup>5</sup>Department of Nephrology, Akron Children's Hospital, Akron, OH, USA

**Background:** In recent years, the use of adrenocorticotrophic hormone (ACTH) therapy for treatment of proteinuria due to nephrotic syndrome (NS) has been heavily explored. ACTH therapy, which comes in the natural (H.P. Acthar Gel) or synthetic (Tetracosactide) form, have resulted in remission in patients with immunosuppressive and steroid-resistant NS. However, the exact efficacy of ACTH therapy in the nephrotic syndrome etiologies, such as membranous nephropathy (MN), focal segmental glomerulosclerosis (FSGS), minimal change disease (MCD), lupus nephritis (LN), IgA nephropathy (IgAN) and membranoproliferative glomerulonephritis (MPGN) has not been determined.

**Objective:** This systematic review analyzed the published literature on ACTH therapy in various NS etiologies to determine its efficacy.

**Methods:** A comprehensive search of MEDLINE, EMBASE, and Cochrane databases was conducted for articles through June 2019. Prospective and retrospective studies of randomized control trials, which studied synthetic or natural ACTH treatment in patients with known etiologies of NS, were included. Studies were excluded when they consisted of a single case report or didn't analyze the lone effect of ACTH in NS.

**Results:** The initial search yielded a total of 348 papers and 21 papers were included. In 122 MN patients, there was an overall remission of 70% (85/122) and an overall remission of 43% (42/98) in FSGS patients. In other etiologies, there were overall remissions of 78% (11/14), 31% (5/16), 38% (8/21) and 62% (8/13) in MCD, LN, IgAN, and MPGN patients, respectively.

**Conclusion:** ACTH showed benefits in proteinuria reduction across all etiologies of NS. However, more randomized controlled studies with larger population sets and longer follow-ups are imperative to establish causal benefits. New studies into its efficacy in children should be also be investigated.