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Editorial

DRUG METABOLISM OF THIAZIDE

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EDITORIAL

Agranulocytosis, skin rashes, taste disturbance, and hyperkalemia brought on by decreased aldosterone secretion are among other adverse effects. Angio oedema with possible upper airway obstruction can result from a rare idiosyncratic reaction to ACEIs and can develop years after the start of ACEI therapy. Since ACEIs are linked to birth abnormalities, they should not be used during pregnancy. Thiazide diuretics are described in this activity's indications, mechanism of action, methods of administration, significant adverse effects, contraindications, toxicity, and monitoring sections so that providers, working as a multidisciplinary team, can direct patient therapy where it is appropriate.

An FDA-approved class of medications called thiazide diuretics prevents the reabsorption of 3–5 percent of luminal sodium in the distal convoluted tubule of the nephron. Thiazide diuretics encourage natriuresis and diuresis in this way. Hydrochlorothiazide (HCTZ), chlorthalidone, and indapamide are the three thiazide diuretics that are most frequently used. The FDA has given both HCTZ and chlorthalidone approval for use in treating primary hypertension. To effectively boost therapeutic response in patients with severe hypertension, clinicians utilize these compounds as either the only mode of treatment or in combination with other antihypertensive medications. Additionally, the FDA has approved the use of HCTZ and chlorthalidone in the

treatment of edema brought on by chronic heart failure (CHF), hepatic cirrhosis, corticosteroids, and estrogen therapy [1,2].

Along with treating nephrotic syndrome, acute glomerulonephritis, and chronic renal failure, these medications are also used to treat edema brought on by other types of renal dysfunction. Indapamide is FDA-approved for the management of primary hypertension as either the sole treatment or in combination with other antihypertensive medications. It is also approved for the treatment of salt and fluid retention associated with CHF. Although not FDA-approved, thiazide diuretics are also recommended for use in the treatment of diabetes insipidus, osteoporosis, and nephrolithiasis. Through blocking the sodium-chloride (Na/Cl) channel in the proximal section of the distal convoluted tubule, thiazide diuretics cause water retention (DCT). The sodium-potassium (Na/K) pump's efficiency is diminished when the Na/Cl channel is blocked, and the transport of sodium and water into the interstitium is also decreased. Thiazide diuretics are activated by altering the concentration of Na distal to the DCT. Ionic channels and pumps then strive to restore normal Na levels. Numerous negative effects result from this secondary adjustment to balance Na levels. The MOA and its impacts on the nephron are covered in greater detail below and are mentioned in the section on negative effects.

Increased sodium and water retention in the lumen and a decrease in Na in the DCT are both brought on by the obstruction of the Na/Cl channel. In addition, as the Na/Cl channel is blocked, more ions are allowed to pass via the Na/Ca channel, increasing the amount of calcium that is re-absorbable into the interstitium in exchange for the return of Na to the DCT. The distal portion of the distal convoluted tubule and collecting tubule receive more sodium when the Na/Cl channel in the proximal segment of the distal convoluted tubule is inhibited. The aldosterone-sensitive Na/K pump increases sodium reabsorption in the main cells as a result of this rise in Na. This exchange boosts K transfer into the collecting tubules and lumen while increasing Na transfer into the interstitium. As a result of this K loss, intercalated cells in the CT increase K absorption through the K/H+ pump, which is likewise aldosterone mediated. The CT will display increased Na reabsorption and increased K and H ion excretion into the urine due to aldosterone-mediated sodium retention, which is triggered by an increase in Na flow to the CT. Tablets containing thiazide diuretics are taken orally. These medications should be taken by patients with breakfast. For the uses that have been approved by the FDA and are described above, HCTZ and

chlorthalidone require different dosages. Both medications often need to be taken at lower doses for the treatment of hypertension, starting at 25 mg per day and increasing to 50 mg or 100 mg, respectively. Increasing the dosage should be done in accordance with the patient's specific therapeutic requirements [3-5].

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