

Edema and the Clinical Use of Diuretics

I. Physiologic Classifications of Diuretic Drugs:

Proximal Diuretics	Loop Diuretics	DCT Diuretics	CD Diuretics
Carbonic Anhydrase Inhibitors	Na⁺ / K⁺ / 2Cl Inhibitors	NaCl Inhibitors	Na Channel Blockers
Acetazolamide	Furosemide	Hydrochlorothiazide	Amiloride
	Bumetanide	Metolazone	Triamterene
	Torsemide	Chlorthalidone	Aldosterone Antagonists
	Ethacrynic Acid	Indapamide	Spironolactone
		Many Others	

II. Adaptation to Diuretic Therapy:

Following the use of diuretics, sodium chloride retention takes place precipitated by hemodynamic, hormonal and cellular events. Factors that affect net sodium loss following the use of diuretics include:

- A. Dietary sodium
- B. Dose of diuretics
- C. Its half life
- D. Frequency of administration

III. Complications of Diuretic Therapy:

- A. Decreased extra cellular fluid volume.
- B. Hyponatremia and hypokalemia.
 - 1. The decrease in serum sodium might be precipitated by thirst activation. Both hyponatremia and hypokalemia are more common in distal collecting tubules diuretics (thiazides and other derivatives). The cause of hypokalemia is related to the increase in tubular flow rate (gradient washout), increased aldosterone release and hypomagnesemia.

Continued on Page 2



NEPHROLOGY ASSOCIATES

Adel B. Korkor, M.D.

David M. Dembski, M.D.

1111 Delafield Street, Suite 212, Waukesha WI 53188

(262) 524-1024

Fax: (262) 524-8767

IV. Treatments of Edema:

- A. Correct the primary cause (heart/liver disease, nephrotic syndrome, etc.).
- B. Decrease dietary sodium intake (2gm or less).
- C. Discontinue drugs that can cause edema and salt retention (calcium channel blockers, Cox-II inhibitors, and nonsteroidal anti-inflammatory drugs, etc.).
- D. Initiate diuretic therapy with distal collecting tubule diuretics and subsequently the addition of loop diuretics. Loop diuretics are favored in patients who have impaired renal function where DCT diuretics are less effective.

V. Diuretic Resistance Cause and Treatment:

The primary cause of diuretic resistance is poor compliance with dietary fluid and salt restrictions, but concomitant use of drugs that promote salt retention and inadequate control of concomitant illness could account for the same.

- A. Management of diuretic resistance at home:
 - 1. Consider the use of loop diuretics at dosages that are above the threshold response level and add another class of diuretics.
 - 2. Always use DCT diuretics one-half (1/2) hour to one (1) hour prior to loop diuretics.
- B. In hospital management:
 - 1. Continuous infusion is ideal. Dose between 4mg and 60mg of furosemide an hour. Such use is advantageous because it avoids peaks and troughs of the diuretic levels, is more efficient, provides better response, can be titrated, and is associated with less complications, especially in regard to electrolytes abnormalities and autotoxicity.



NEPHROLOGY ASSOCIATES

Adel B. Korkor, M.D.

David M. Dembski, M.D.