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Are Protein Powders Safe Enough in Patients with Acute Kidney Injury?

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ABSTRACT

Protein powders are powdered forms of protein that come from plants (soybeans, peas, rice, potatoes, or hemp), eggs, or milk (casein or whey protein). The powders may include other ingredients such as added sugars, artificial flavouring, thickeners, vitamins, and minerals. The Recommended Dietary Allowance for protein intake for an AKI patient as per latest nutritional ASPEN guidelines is 1-1.2g/kg/day.

CASE DESCRIPTION

Here is an interesting case of a young female patient, G2P1L1 at 7 months gestation, presented with breathlessness and oliguria for 5 days, along with drowsiness since the morning of admission. She had a history of a breast abscess drained 15 days earlier at a local hospital. On arrival, the patient was in a gasping state and was intubated immediately. Investigations revealed severe metabolic acidosis and AKI (serum creatinine 3.8 mg/dL). A nephrology consult was obtained, and she was started on broad-spectrum antibiotics and underwent urgent hemodialysis. After two dialysis sessions, the patient showed marked clinical improvement, was extubated, and demonstrated good urine output with a decreasing trend in serum creatinine [1-3].

She was diagnosed with P1 L1 D1, septic AKI secondary to breast ulcer, and intrauterine fetal demise (IUFD). Despite recovery of renal function (creatinine reduced to 1.2 mg/dL), she continued to have hyperkalemia, even after receiving standard potassium lowering treatments in the form of calcium gluconate, insulin drip, nebulization, soda bicarbonate injections in NS, K+ bind sachets, etc.

Approach and Discussion

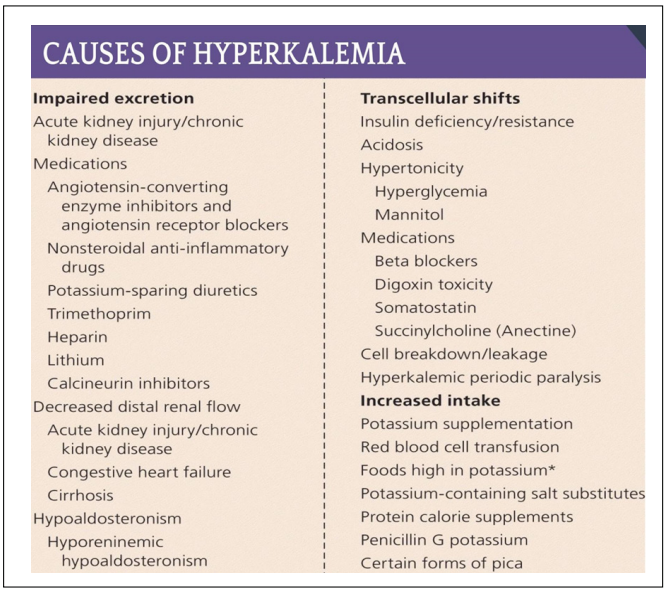
As the case proceeded, we tried to rule out each possible cause of persistent hyperkalemia with or without corresponding ECG changes, The possible causes for hyperkalemia in this case are likely to be:

- Hyporeninemic hypoaldosteronism - > Renal tubular acidosis type 4
- Increased oral intake of K+

Her ABG was suggestive of metabolic acidosis which further pointed towards Type 4 RTA. A thorough review of the patient's diet revealed that she had been given Pentasure protein powder, 2 scoops three times daily, as part of her dietary regimen. This intake provided an estimated 1440 mg of potassium daily (240 mg per 30g scoop x 6 scoops), contributing to her persistent hyperkalemia. This dietary source of potassium, in combination with her oral potassium intake, exacerbated her condition, further complicating the management of hyperkalemia.

Management and Outcome

Upon discontinuing the protein powder, the patient's hyperkalemia gradually resolved over the following days. However, due to persistent potassium elevation, a third round of hemodialysis was required for potassium removal. Potassium toxicity is known to cause significant cardiovascular, neuromuscular, and gastrointestinal disturbances, and the patient's management included both potassium-lowering medications and mechanical potassium removal. Following these interventions, her potassium levels returned to normal, and her renal function continued to improve.



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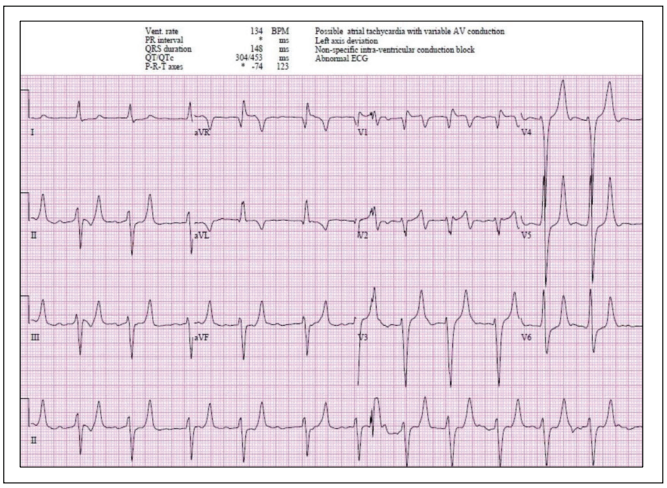
PentaSure® HP	Unit	Per 100 g Powder (approx.)	Per 30 g Powder (approx.)
NUTRITIONAL FACTS			
Caloric Content	kcal / kjoules	402/1683	121/505
Calories From Fat	kcal / kjoules	32/134	10/40
Nutrients			
Total Carbohydrates	g	49.50	14.85
Dietary Fibre	g	4	1.20
Sucrose	g	0	0
Total Fat	g	3.50	1.05
Saturated Fatty acid	g	2.386	0.715
Polyunsaturated Fatty acid	g	0.164	0.049
Linoleic acid(Omega-6-Fatty acid)	g	0.160	0.048
Linolenic acid(Omega-3-Fatty acid)	g	0.002	0.0006
Monounsaturated Fatty acid	g	0.071	0.021
Trans Fat	g	<0.66	<0.2
Cholesterol	mg	<50	<15
Protein	g	43	12.90
Glutamic acid	g	7.86	2.35
Leucine	g	4.42	1.32
Isoleucine	g	2.66	0.79
Valine	g	2.45	0.73
Cystine	g	1.24	0.37
Alpha Lipoic Acid	mg	200	60
Vitamins			
Vitamin A (RE)	IU	2000	600
Vitamin D	IU	168	50.40
Vitamin E (α-TE)	IU	10	3
Choline	mg	200	60
Vitamin C	mg	70	21
Niacin (NE)	mg	10	3
Pantothenic Acid	mg	5	1.5
Vitamin B6	mg	1.8	0.54
Vitamin B2	mg	1.5	0.45
Vitamin B1	mg	1.5	0.45
Folic Acid	mcg	150	45
Vitamin K	mcg	60	18
Biotin	mcg	25	7.5
Vitamin B12	mcg	1	0.30
Minerals			
Potassium	mg	800	240
Calcium	mg	500	150
Sodium	mg	500	150
Phosphorus	mg	300	90
Chloride	mg	462.31	138.69
Magnesium	mg	80	24
Iron	mg	7	2.1
Manganese	mg	1.5	0.45
Zinc	mg	4.50	1.35
Copper	mg	1.6	0.48
Iodine	mcg	120	36
Selenium	mcg	30	9
Chromium	mcg	30	9



Conclusion

"Too much protein stresses the kidney"

Protein powders thus prescribed to AKI patients should have minimal quantities of potassium and phosphates to avoid progression of disease. Though the amount of potassium is low but it still cannot be ignored when prescribing to AKI patients or even to

patients with reduced GFR. And it should be used judiciously to avoid discrepancies in patient care.

Conflict of Interest: None

Ethical Consideration: Not required.

References

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