

## Introduction

Hyperkalemia, characterized by serum potassium concentrations exceeding 5.5 mmol/l, poses significant clinical challenges due to its potential to induce fatal dysrhythmias and muscle dysfunctions. Multiple pathologies, including chronic kidney disease (CKD) and diabetes mellitus, predispose individuals to this electrolyte imbalance. Its clinical manifestations often remain nonspecific, rendering a thorough history and physical pivotal for diagnosis. This review synthesizes the available literature, focusing on the diagnosis of hyperkalemia through comprehensive clinical assessments, and the pharmacological interventions available for its management.

The advent of drugs with escalating specificity for potassium offers promising avenues for treatment. Traditional agents like Sodium Polystyrene Sulfonate have been supplemented with newer entrants such as Sodium Zirconium Cyclosilicate and Patiromer. These agents exert their effects primarily within the gastrointestinal (GI) tract, harnessing distinct mechanisms of action. Importantly, their therapeutic profiles encompass a spectrum of benefits and contraindications. It is imperative for clinicians to remain updated about the evolving pharmacotherapeutic landscape of hyperkalemia management. This knowledge equips them to tailor treatments effectively, optimizing patient outcomes in the face of this life-threatening electrolyte disturbance.

### Antagonism of membrane actions of potassium

Calcium

### Drive extracellular potassium into the cells

Insulin and glucose

Sodium bicarbonate, primarily if metabolic acidosis

Beta-2-adrenergic agonists

### Removal of potassium from the body

Loop or thiazide diuretics

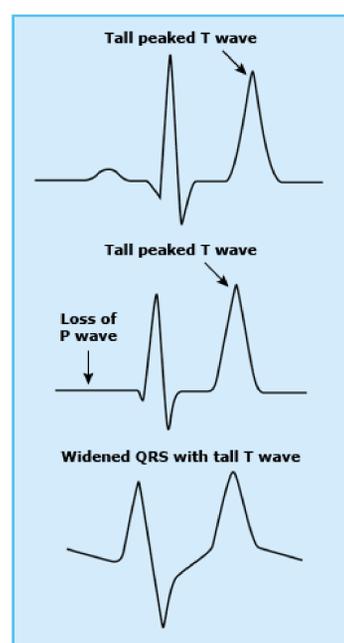
Cation exchange resin

Dialysis, preferably hemodialysis if severe

**Table 1: Hyperkalemia treatment mechanisms**

Mount, David B. Treatment and prevention of hyperkalemia in adults. In: UpToDate, Post TW (Ed), Wolters Kluwer. <https://www.uptodate.com> (Accessed on October 12, 2023.)

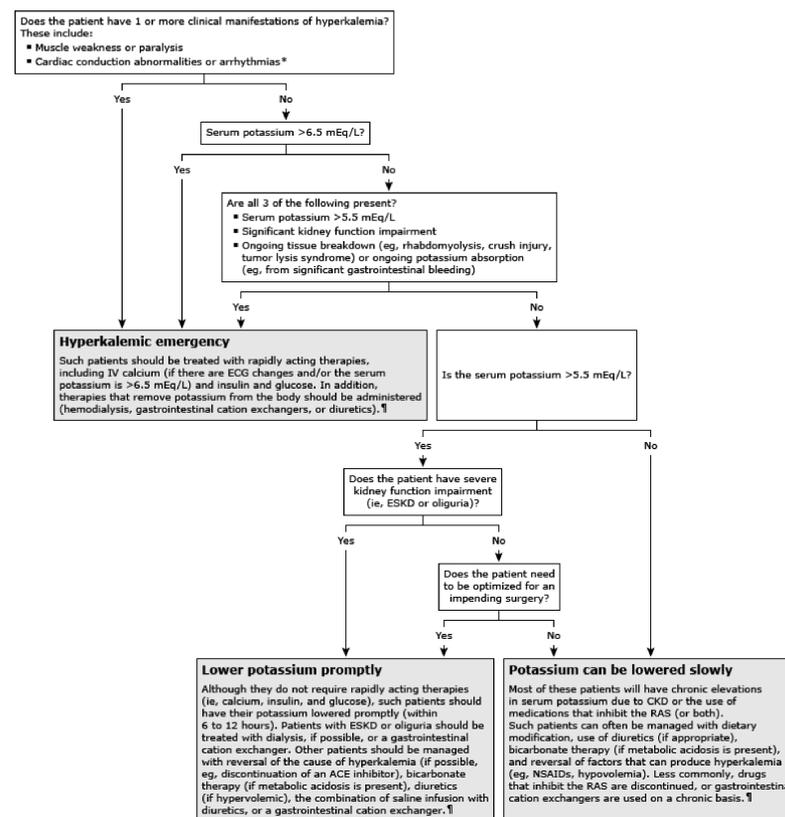
## ECG & Treatment Algorithm



Serum potassium	Major change
5.5-6.5	Tall peaked T waves
6.5-7.5	Loss of P waves
7.0-8.0	Widening of QRS
8.0-10.0	Sine wave, ventricular arrhythmia, asystole

**Figure 1: Typical electrocardiographic features of hyperkalemia**

Adapted from: Mattu A, Brady WJ, Robinson DA. Electrocardiographic manifestations of hyperkalemia. Am J Emerg Med 2000; 18:721.



**Figure 2: Algorithm for treatment of hyperkalemia in adults**

Mount, David B. Treatment and prevention of hyperkalemia in adults. In: UpToDate, Post TW (Ed), Wolters Kluwer. <https://www.uptodate.com> (Accessed on October 12, 2023.)

## Conclusion

Hyperkalemia is a potentially life-threatening condition. While there are some unique symptoms, like peaked T-waves on ECG, many symptoms of hyperkalemia are nonspecific. There are a many causes of hyperkalemia like CKD or certain medications. It is important to act quickly when a patient is suspected of having hyperkalemia or else their condition may deteriorate.

Certain medications like Sodium Polystyrene Sulfonate (SPS), Sodium Zirconium Cyclosilicate (SZC), and Patiromer can be helpful in treating hyperkalemia. The mechanism of SPS involves circulation through the gastrointestinal tract where it releases sodium ions in exchange for potassium ions and ultimately excreted via feces. It is important to note that SPS is nonspecific for potassium ions, and it may pick up other ions like calcium instead. Other resins, like SZC work similarly to SPS but may have more selectivity for potassium. Finally, Patiromer works by selectively binding to potassium in the distal colon where potassium levels are higher than other ions.

All three drugs work in the gastrointestinal tract so caution must be used when prescribing these to patients with GI disorders. Certain patient populations may also benefit from one medication over the other. It is important to take a thorough past medical history to identify if patients have predisposing conditions that may make one therapy more suitable than another.

In conclusion, hyperkalemia can be treated with a variety of different medications. It is important that clinicians are aware of these newer medications which may have better selectivity for potassium excretion. These medications can aid in the prompt treatment of patients who are at risk for or suffer from hyperkalemia.