Post-AKI Care

Timing of RAS Blockade Restart and BP Targets

Case Example: Post-AKI Management Decisions

Patient Background

56-year-old male with type 2 diabetes, hypertension, non-ischaemic cardiomyopathy (LVEF 40%), and CKD stage 3A due to presumed diabetic kidney disease.

Baseline Parameters

Creatinine	eGFR	K+	BP	uACR
144 µmol/L	**49 mL/min**	**4.5 mmol/L**	**129/82 mmHg**	**80 mg/mmol**

Admission Event

Oliguric AKI on CKD due to community-acquired pneumonia and volume depletion. Initial shock (BP 80/46 mmHg) requiring inotropic support. **Candesartan, Bisoprolol, and Spironolactone withheld.** Creatinine peaked at 450 µmol/L with subsequent decompensated heart failure.

Discharge Status

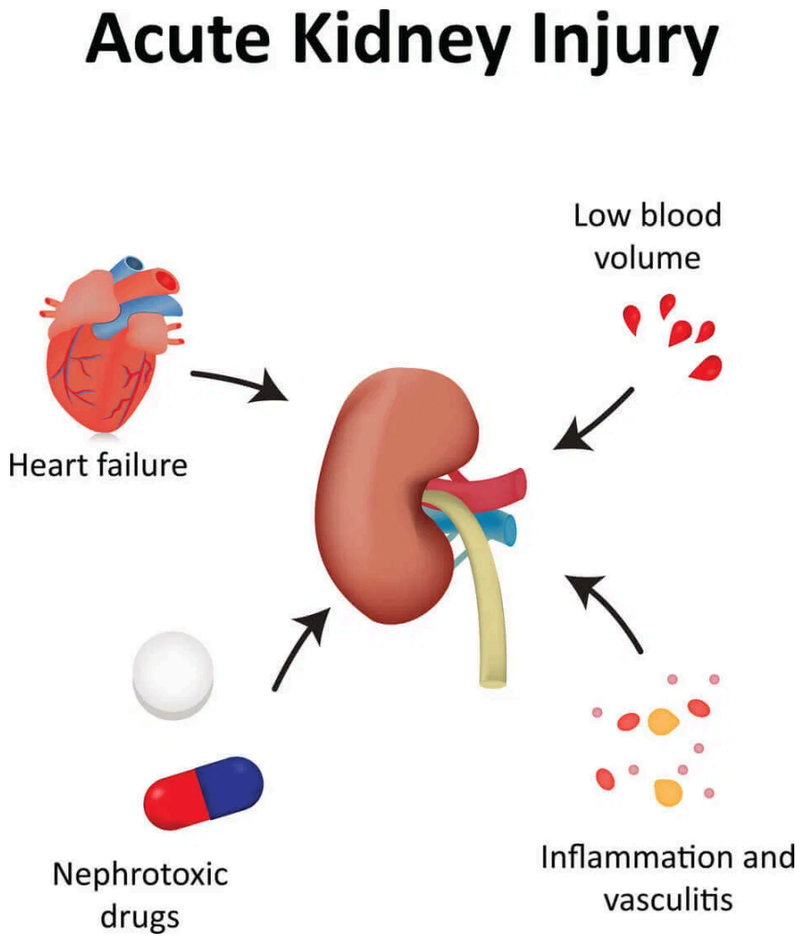
1 kg above target weight, on Furosemide 80mg BD. **Empagliflozin and Bisoprolol restarted.**

BP	Creatinine	K+	HR
153/92 mmHg	**285 µmol/L**	**5.4 mmol/L**	**88 bpm**

Clinical Questions

- When would you restart **Candesartan**?
- When would you restart **Spironolactone**?
- What **blood pressure target** would you aim for?
- Would you consider adding a **GLP-1 agonist**?

Acute Kidney Injury: Epidemiology and Impact



Global Epidemiology

Affects approximately **13.3 million** people globally per year

Mehta et al. Kidney Int 2015;88:950-7

Hospital-acquired AKI incidence: **8-16%** of all admissions

Susantitaphong et al. Clin J Am Soc Nephrol 2013;8:1482-93

Mortality and Outcomes

Short and Long-term Mortality

In-hospital mortality: **~24%**

1-year mortality: **~27%**

Chertow et al. J Am Soc Nephrol 2005;16:3365-70

Long-term Complications

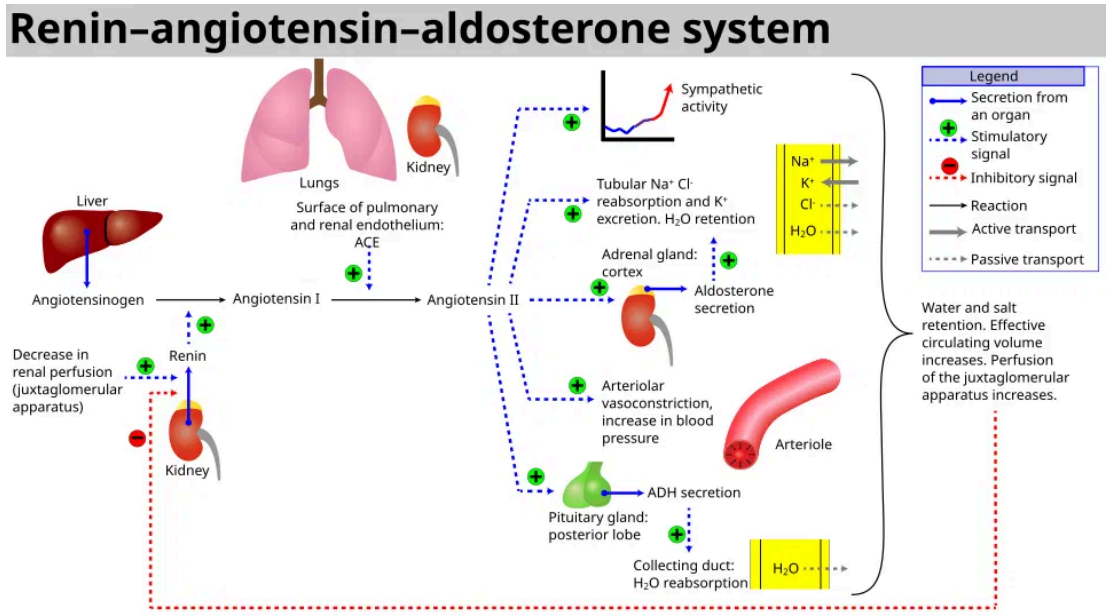
Increased risk of CKD progression and ESRD

Coca et al. Kidney Int 2012;81:442-8

Elevated cardiovascular events and recurrent AKI

Go et al. N Engl J Med 2004;351:1296-305

RAS Blockade: Benefits, Risks, and Sick-Day Guidance



Beneficial Effects

- **Renoprotection:** Reduces intraglomerular pressure and proteinuria
- **Cardioprotection:** Reduces cardiovascular events and mortality
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Potential Harms

- **Hyperkalemia:** Especially in CKD, diabetes, or with other K+-sparing drugs
- **Acute kidney injury:** Risk during volume depletion or hypotension
- **Hypotension:** Particularly in elderly or volume-depleted patients

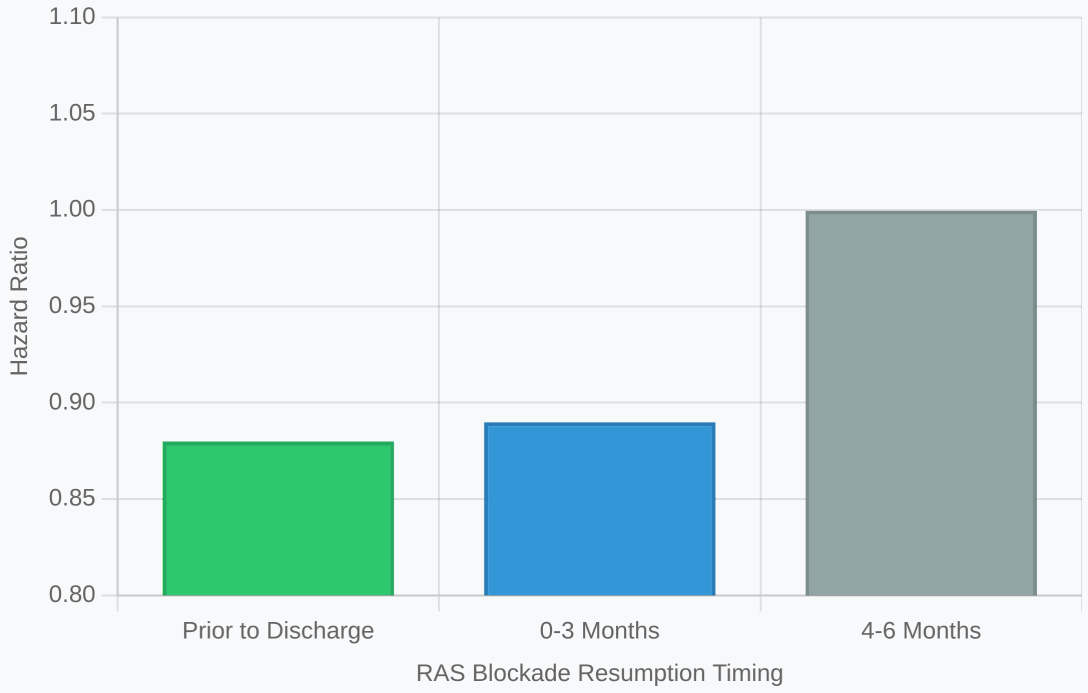
"Sick-Day" Guidance - Withhold When:

- **Dehydration/Vomiting:** Risk of volume depletion
- **Diarrhea:** Fluid and electrolyte losses
- **Fever/Infection:** Increased risk of hypotension and AKI

RAS Blockade Timing: Evidence from Key 2024-2025 Studies

Chen et al. (2024) - Timing and Mortality

Kidney Int Reports | 5,392 AKI survivors

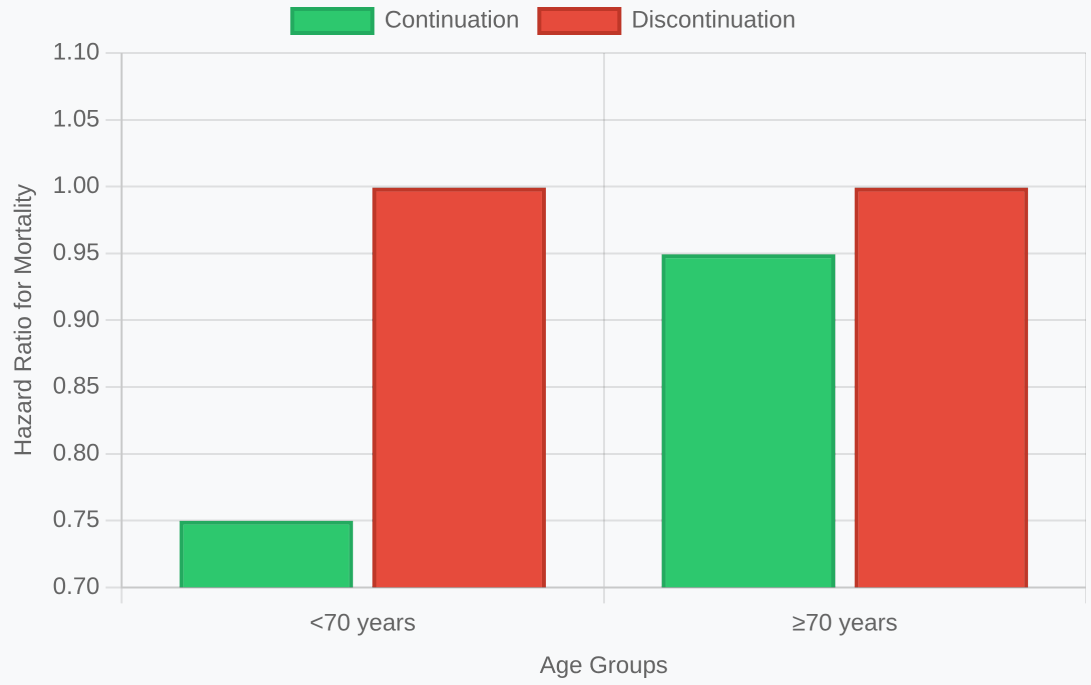


Early resumption (before discharge or 0-3 months) associated with **12-15% lower mortality risk**

HR 0.88 (95% CI: 0.79-0.98) and HR 0.89 (95% CI: 0.81-0.97)

Hashimoto et al. (2025) - Age Interaction

Hypertension Research | RASi discontinuation after hyperkalemia



Patients **<70 years** showed greater benefit from **RASi continuation** despite hyperkalemia

HR 0.75 (95% CI: 0.65-0.87) vs HR 0.95 (95% CI: 0.82-1.10)

Timeline-Centred Framework for RASi Restart

Phase 1: Immediate to Early (1-2 weeks post-discharge)

Stabilization checkpoint: Before considering reinitiating RAS-blockade, ensure renal function has stabilized—serum creatinine has plateaued or begun improving, and potassium is safely managed.

Phase 2: Reinitiation of RAS-Blockade (within 1 year)

> ***Supporting evidence (2024 observational study):*** *Restarting RAS inhibitors within 1 year of discontinuation was associated with:*

- Lower risk of adverse kidney outcomes (≥50% eGFR decline, need for KRT) — **HR 0.85 (95% CI, 0.78–0.93)**
- Significantly reduced mortality — **HR 0.70 (95% CI, 0.61–0.80)**
- No increase in hyperkalemia risk — **HR 1.11 (95% CI, 0.96–1.27)**

Takeaway: Aim to restart RAS-blockade within a year, once kidney function and electrolytes are stable, given the benefits on both renal and survival outcomes.

Phase 3: Ongoing Monitoring (3 months to 1 year follow-up)

After restarting RAS-blockade, continue to monitor kidney function and potassium regularly, especially for the first few months, adjusting doses as needed and watching for **hyperkalemia or GFR drops**.

BP Studies Comparison: Study Characteristics

Table by Dr Shahin Mohammed and Dr Madiha Aziz on NephJC (modified)

Parameter	BPROAD (2024)	ACCORD (2010)	SPRINT (2015)	ESPRIT (2024)
Sample Size (N)	**12,821**	**4,733**	**9,261**	**11,255**
Age Criteria	>50 years	40-79 with CVD or 55-79 with subclinical CVD	>55 years	>50 years
Mean Age	63.8 years	62.2 years	67.9 years	64.6 years
Diabetes Status	**100% diabetic**	**100% diabetic**	**Excluded diabetics**	38.7% diabetic
Country/Region/ Ethnicities	China	USA, Canada (60.5% Caucasian, 24.1% African, 7% Hispanic, 8.4% Other)	USA (57.7% Caucasian, 29.9% African, 10.5% Hispanic, 1.9% Other)	China
BP Measurement	Automated (Omron)	Automated (Omron)	Automated (Omron) Mainly unattended	Automated (Omron)
CKD Exclusion	eGFR <30 or creatinine >2 mg/dl	Creatinine >1.5 mg/dl	eGFR <20	eGFR <45
Proteinuria Exclusion	>1 g/day	>1 g/day	>1 g/day	≥2+ in last 6 months
Other Key Exclusions	Glomerulonephritis	Organ transplant	GN likely/needing IS Organ transplant	GN likely/needing IS Organ transplant

BP Studies Comparison: Outcomes and Adverse Events

Table by Dr Shahin Mohammed and Dr Madiha Aziz on NephJC (modified)

Outcome	BPROAD (2024)	ACCORD (2010)	SPRINT (2015)	ESPRIT (2024)
Median Follow-up	4.2 years	4.7 years	3.26 years	3.4 years
Mean Achieved SBP (Intensive vs Standard)	121.6 vs 133.2 mmHg	119.3 vs 133.5 mmHg	121.4 vs 136.2 mmHg	119.1 vs 134.8 mmHg
SBP Difference at 1 Year	-11.6 mmHg	-14.2 mmHg	-14.8 mmHg	-15.7 mmHg
Composite CV Outcome	**IR 1.65 vs 2.09** **HR 0.79 (0.69-0.90)**	1.87 vs 2.89% /year HR 0.88 (0.73-1.06)	**1.65 vs 2.19% /year** **HR 0.75 (0.64-0.89)**	**7.4 vs 8.8%** **HR 0.88 (0.78-0.99)**
All-Cause Mortality	**IR 0.69 vs 0.73** **HR 0.95 (0.77-1.17)**	1.28 vs 1.19% /year HR 1.07 (0.85-1.35)	**1.03 vs 1.4% /year** **HR 0.73 (0.60-0.90)**	**2.8 vs 3.6%** **HR 0.79 (0.64-0.97)**
Stroke	**IR 1.19 vs 1.5** **HR 0.79 (0.67-0.92)**	**0.32 vs 0.53% /year** **HR 0.59 (0.39-0.89)**	0.41 vs 0.47% /year HR 0.89 (0.63-1.25)	4.7 vs 5.4% HR 0.86 (0.73-1.02)
Heart Failure	**IR 0.13 vs .19** **HR 0.66 (0.41-1.04)**	0.73 vs 0.78% /year HR 0.94 (0.70-1.26)	**0.41 vs 0.67% /year** **HR 0.62 (0.45-0.84)**	**1 vs 1.4%** **HR 0.73 (0.52-1.03)**
CV Death	**IR 0.24 vs 0.32** **HR 0.76 (0.55-1.06)**	0.52 vs 0.49% /year HR 1.06 (0.74-1.52)	**0.25 vs 0.43% /year** **HR 0.57 (0.38-0.85)**	**1.1 vs 1.7%** **HR 0.61 (0.44-0.84)**

Intensive Home BP Lowering in Advanced CKD

Ku et al. - American Journal of Kidney Diseases, March 2025

Study Design

- **RCT pilot study** - 108 patients, 12 months
- Advanced CKD (eGFR ≤30) + hypertension

Intervention

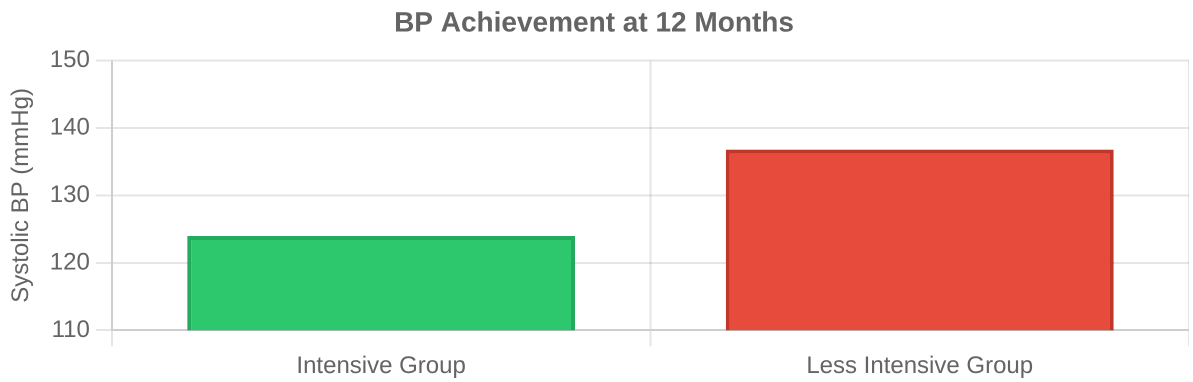
- **Wireless home BP monitor** with real-time transmission
- Intensive (N=66): target <120 mmHg
- Less intensive (N=42): standard target

Safety Outcomes

- Hyperkalemia: **No significant difference**
- Falls/syncope: **No significant difference**
- Need for dialysis: **No significant difference**

Primary Results

- SBP difference: **11.7 mmHg lower** (P<0.001)
- Intensive: 124.7 mmHg vs Less intensive: 138.2 mmHg



Clinical Implications

- SBP <120 mmHg **feasible and safe** with home monitoring
- **Larger trials needed** for long-term outcomes

Conclusions and Key Takeaways

RAS Blockade Restart

- **Early resumption** (within 3 months) → 12-15% lower mortality
- Benefits outweigh risks even with **hyperkalemia history**
- Withhold during **"sick days"** (dehydration, fever)

Blood Pressure Targets

New Target SBP **<120 mmHg** when tolerated

- **Home BP monitoring** feasible in advanced CKD
- Individualized approach considering age and comorbidities

Regular Monitoring

- Regular **kidney function and electrolyte** monitoring
- Frequent follow-up in first 3 months post-AKI
- Prevent hyperkalemia rather than discontinue RASi

ESC/ESH Guidelines (2024)

- Primary target BP **< 130/80mmHg** for most patients
- Age 65 - 79: BP **< 130/80mmHg if tolerated,** otherwise < 140/80mmHg
- Age >=80, **140-150/<80mmHg,**
- Focus on **frailty rather than chronological age**
- Strong recommendation for out-of-office BP monitoring

KDIGO Guidelines (2021)

- Target SBP **<120 mmHg** (conditional recommendation)
- ACE inhibitors/ARBs as **first-line therapy** in CKD
- Individualize targets based on patient factors

ACC/AHA Guidelines (2017)

- General target **<130/80 mmHg** for most adults
- *Proposed systolic BP target **<120/70 mmHg** in 2025*
- **Ages 65-79**: <130/80 mmHg (if tolerated)
- **Age ≥80**: Individualized approach, higher targets may be appropriate
- Clinical judgment for multiple comorbidities

Age-Specific BP Targets

- **Ages 65-79**: Target <130/80 mmHg
- **Age ≥80**: Individualized approach, consider frailty over chronological age
- Balance **cardiovascular benefits vs. adverse events** in elderly

Practical Implementation

- **Shared decision-making** with patients