CKD Non-Dialysis Anemia Management Protocol

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The following protocol, on order of physician, transfers anemia management of CKD non-dialysis patients to non-physician staff (i.e. RNs and renal pharmacists). **The following protocol is intended to serve as a guide and cannot replace clinical judgement**. The recommendations included may be inappropriate for specific clinical situations (e.g. patients with hemochromatosis, thalassemia, PRCA, allergy to IV iron or an erythropoiesis stimulating agent (ESA), hx of stroke, active malignancy, hx of malignancy, etc.). The lowest ESA dosage to achieve acceptable Hgb range should be used. This algorithm is based on the assumption that the patient is compliant to medication and blood work. **Note: ESA refers to both epoetin alfa (Eprex®) and darbepoetin alfa (Aranesp®).**

Any change in Hgb greater than or equal to 15 g/L, OR if Hgb is less than 85 g/L OR if Hgb is greater than 139 g/L AND on ESA (or ESA on hold) → Notify nephrologist

Hgb less than 95 g/L

Receiving ESA?

NO

Check that the previous iron studies have been appropriately monitored and addressed prior to increasing the dose.

Suggested initial dose: epoetin 50 units/kg/wk or darbepoetin 0.22 mcg/kg/wk. Obtain an order from MD to start anemia protocol.

YES

- Check that the previous iron studies have been appropriately monitored and addressed prior to increasing the dose.
- **If TSAT less than 22%, consider increasing PO iron dosage or prescribing IV iron**

- If no dose increase in the past 5 weeks, **increase ESA dose** as per ESA Dosage Adjustment Tables.
- If dose was increased in past 5 weeks, maintain that dose until next blood work.
- Continue to monitor Hgb at the regular blood work cycle.
- **Notify MD if Hgb is not in target range after 3 consecutive dose increases.** Refer to ESA Hyporesponsiveness Flowchart.

Hgb 95 to 115 g/L and stable

Receiving ESA?

NO

No ESA required. Continue to monitor Hgb at the regular blood work cycle.

YES

Maintain ESA dose and continue to monitor Hgb at the regular bloodwork cycle.

ESA on hold or discontinued because Hgb above target

- **Restart ESA at a reduced dose based on the dose before hold.** Refer to protocol ESA Dosage Adjustment Tables.
- Continue Hgb monitoring at regular blood work cycle.

Hgb greater than 115 g/L

Receiving ESA?

NO

No ESA required. Continue to monitor Hgb at the regular blood work cycle.

- If there has been no dosage reduction in the past 5 weeks, **reduce ESA dosage** as per protocol ESA Dosage Adjustment Tables.
- If there have been dosage reductions in the past 5 weeks, maintain current dose.
- Measure Hgb at the regular blood work cycle.

YES

Hgb 116 to 125 g/L

- **Hold ESA**
- Measure Hgb in 2 weeks and reassess Hgb status and ESA dosage.
- If Hgb is greater than 125 g/L after 12 weeks of hold, discontinue ESA - no ESA required.

Hgb greater than 125 g/L

- **Hold ESA**
- Measure Hgb in 2 weeks and reassess Hgb status and ESA dosage.
- If Hgb is greater than 125 g/L after 12 weeks of hold, discontinue ESA - no ESA required.

ESA on hold or discontinued because Hgb above target

Hgb 116 to 125 g/L

If change is greater than 10 g/L from last hemoglobin, then **resume ESA at reduced dose.** Refer to protocol ESA Dosage Adjustment Tables.

If change is less than or equal to 10 g/L from last hemoglobin, then **continue to hold ESA**.

Continue to monitor Hgb at the regular bloodwork cycle.

AFTER Hgb STATUS ASSESSMENT ABOVE, ASSESS IRON STATUS. Refer to page 2 for ferrous fumarate or intravenous iron protocol.

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PAGE 2: ASSESS IRON STATUS (Standard Iron Parameters – TSAT & Ferritin)
If the patient has signs and symptoms of sepsis (e.g. temperature greater than 38', chills, rigors, unexplained hypotension), notify the nephrologist to assess ongoing iron use. If the serum ferritin is above 1000mcg/L, hold intravenous iron.

Notify nephrologist if ferritin less than 20 mcg/L

TSAT less than 22%
REPLENISH IRON STORES

If patient is currently not receiving iron therapy:
- **Contact MD to start ferrous fumarate (e.g. 300 mg po HS)**
- If TSAT less than 10%, order ferrous fumarate 300 mg po HS x 1 week, then 600 mg po HS

If patient is currently receiving oral iron therapy:
- Assess iron compliance and proper administration (empty stomach)
- Increase ferrous fumarate by 300 mg/day as tolerated (max. 900 mg/day)

Notify MD if iron parameters remain low after 3 consecutive blood work cycles.

If oral iron is ineffective or patient is intolerant, consider giving IV iron.

Measure TSAT and ferritin with Q3 or 4 months bloodwork cycle and reassess iron dosage regimen.

TSAT 22% to 49%
MAINTAIN IRON STORES

If receiving PO iron:
Continue current maintenance dose

If PO iron is currently on hold due to iron overload:
Consider restarting ferrous fumarate at half the previous dose. Ferrous sulfate and ferrous gluconate could also be considered.

Measure TSAT and ferritin in 6-12 weeks as per local program policy and reassess iron dosage regimen.

TSAT greater than or equal to 50%
POSSIBLE IRON OVERLOAD

HOLD IRON

Measure TSAT and ferritin at next routine blood work cycle and reassess iron dosage regimen.

Note: Notify MD if iron indices remain high for 3 consecutive blood work cycles.

If patient is unable to tolerate or adhere to oral iron regimen:
Schedule IV iron as per nephrologist's prescription.
Measure TSAT and ferritin in 12 weeks (and at least 1 week after last IV iron dose) and reassess.

Usual maximum single doses tolerated of common agents:
- Iron sucrose 200-300 mg over 2-3 hours as per local practice & policy
- Iron isomaltoside (Monoferric) 500-1000 mg IV (infusion time varies)
- Sodium ferric gluconate (Ferrlecit®) 125mg IV over 1 hour

*** If iron blood work appears unusual compared to previous results (e.g. replacement of iron stores, TSAT goes from less than 25% to greater than 49%) repeat the blood work before initiating next action.

CKD Non-Dialysis Anemia Management Protocol: ESA Dosing Adjustment Table

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The following tables provide guidance for most dosage adjustments. If a patient's Hgb cannot be maintained within the desired range with 3 consecutive dose modifications using the dosage schedule below, contact a nephrologist or renal pharmacist for advice. If a patient's erythropoiesis stimulating agent (ESA) dosage is not available in the tables below, please contact a nephrologist for ESA dosage modification. The lowest ESA dosage to maintain Hgb within acceptable range should be used.

Darbepoetin Alfa (Aranesp®) Dosage Adjustment Table

Pre-filled syringes available include: 10 mcg, 20 mcg, 30 mcg, 40 mcg, 50 mcg, 60 mcg, 80 mcg, 100 mcg, 130 mcg and 150 mcg.

Current Dose	Increase Dose*	Decrease Dose*
10 mcg subcut every 2 weeks	20 mcg subcut every 2 weeks	D/C, check Hgb in 2 weeks
20 mcg subcut every 2 weeks	30 mcg subcut every 2 weeks	10 mcg subcut every 2 weeks
30 mcg subcut every 2 weeks	40 mcg subcut every 2 weeks	20 mcg subcut every 2 weeks
40 mcg subcut every 2 weeks	50 mcg subcut every 2 weeks	30 mcg subcut every 2 weeks
50 mcg subcut every 2 weeks	60 mcg subcut every 2 weeks	40 mcg subcut every 2 weeks
60 mcg subcut every 2 weeks	80 mcg subcut every 2 weeks	50 mcg subcut every 2 weeks
80 mcg subcut every 2 weeks	100 mcg subcut every 2 weeks	60 mcg subcut every 2 weeks
100 mcg subcut every 2 weeks	130 mcg subcut every 2 weeks	80 mcg subcut every 2 weeks
130 mcg subcut every 2 weeks	150 mcg subcut every 2 weeks	100 mcg subcut every 2 weeks
150 mcg subcut every 2 weeks	100 mcg subcut every 1 week	130 mcg subcut every 2 weeks
100 mcg subcut every 1 week	130 mcg subcut every 1 week	150 mcg subcut every 2 weeks
130 mcg subcut every 1 week	150 mcg subcut every 1 week	100 mcg subcut every 1 week
150 mcg subcut every 1 week	No further increase, check with nephrologist	130 mcg subcut every 1 week

***For dosage increase or decrease, change interval to use up current syringes before starting new dosage. Refer to ESA Dosing Interval Adjustment Table.**

Epoetin Alfa (Eprex®) Dosage Adjustment Table

Pre-filled syringes available include: 1000 units, 2000 units, 3000 units, 4000 units, 5000 units, 6000 units, 8000 units and 10,000 units.

Current Dose	Increase Dose*	Decrease Dose*
1,000 units subcut every 1 week	2,000 units subcut every 1 week	D/C, check Hgb in 2 weeks
2,000 units subcut every 1 week	3,000 units subcut every 1 week	1,000 units subcut every 1 week
3,000 units subcut every 1 week	4,000 units subcut every 1 week	2,000 units subcut every 1 week
4,000 units subcut every 1 week	5,000 units subcut every 1 week	3,000 units subcut every 1 week
5,000 units subcut every 1 week	6,000 units subcut every 1 week	4,000 units subcut every 1 week
6,000 units subcut every 1 week	8,000 units subcut every 1 week	5,000 units subcut every 1 week
8,000 units subcut every 1 week	10,000 units subcut every 1 week	6,000 units subcut every 1 week
10,000 units subcut every 1 week	6,000 units subcut twice per week	8,000 units subcut every 1 week
6,000 units subcut twice per week	8,000 units subcut twice per week	10,000 units subcut every 1 week
8,000 units subcut twice per week	10,000 units subcut twice per week	6,000 units subcut twice per week
10,000 units subcut twice per week	8,000 units subcut 3 times per week	8,000 units subcut twice per week
8,000 units subcut 3 times per week	10,000 units subcut 3 times per week	10,000 units subcut twice per week
10,000 units subcut 3 times per week	No further increase, check with nephrologist	8,000 units subcut 3 times per week

***For dosage increase or decrease, change interval to use up current syringes before starting new dosage. Refer to ESA Dosing Interval Adjustment Table.**

Reviewed April 2021, Updated Nov 2021

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DARBEPOETIN ALFA (ARANESP®) DOSING INTERVAL ADJUSTMENT TABLE (to use up current supplies at home)

CURRENT DOSE	INCREASED DOSE	DECREASED DOSE
	CHANGE INTERVAL TO	CHANGE INTERVAL TO
10 mcg every 2 weeks	Every 10 days	HOLD
20 mcg every 2 weeks		Every 21 days
30 mcg every 2 weeks		
40 mcg every 2 weeks		
50 mcg every 2 weeks		
60 mcg every 2 weeks		
80 mcg every 2 weeks		
100 mcg every 2 weeks		
130 mcg every 2 weeks		
150 mcg every 2 weeks		
100 mcg every 1 week	Every 5 days	Every 10 days
130 mcg every 1 week		
150 mcg every 1 week	Check with MD	

EPOETIN ALFA (EPREX®) DOSING INTERVAL ADJUSTMENT TABLE (to use up current supplies at home)

CURRENT DOSE	INCREASED DOSE	DECREASED DOSE
	CHANGE INTERVAL TO	CHANGE INTERVAL TO
1,000 units every 1 week	Every 5 days	HOLD
2,000 units every 1 week		Every 10 days
3,000 units every 1 week		
4,000 units every 1 week		
5,000 units every 1 week		
6,000 units every 1 week		
8,000 units every 1 week		
10,000 units every 1 week		
6,000 units twice per week	Every 3 days	Every 5 days
8,000 units twice per week		
10,000 units twice per week		
8,000 units three times per week	Every 2 days	Every 3 days
10,000 units three times per week	Check with MD	

Reviewed April 2021, Updated Nov 2021