HER FOUNDATION NVP ALGORITHM

The HER Foundation® clinical team of physicians, nurses and other health professionals developed this algorithm based on over two decades of experience with HG patients, research, and personal experience. Unfortunately, minimal funds have been allocated for trials of HG therapies, so there is no clear evidence on exact medication regimens. However, clinical practice with many thousands of patients has resulted in this very practical and effective algorithm. The HER algorithm has similarities to ACOG Guidelines but includes numerous embedded strategies for prevention of complications and optimizing patient response. Additional recommendations are given in HER's Care Planning form in the Assessment Packet. (hyperemesis.org/tools) HER's expert clinicians can train your team on HG management and HER's innovative resources to reduce costs and improve outcomes.

A few evidence-based recommendations exclusive to the HER Algorithm:

- HER recognizes the pain sensitivity and atrophy resulting from malnutrition and weight loss, and thus recommends IV vitamins and avoiding intramuscular injections.
- HER suggests gastrointestinal mucosal protection prophylactically.
- HER specifies a daily bowel regimen for prevention of constipation from serotonin antagonists.
- HER works with thiamin experts to determine therapeutic dosing of B1 and required co-factors for prevention and treatment of Wernicke's encephalopathy and B1 deficiency sequelae.
- HER recommends avoiding medication combinations leading to adverse side-effects (QT prolongation).
- HER provides guidance on initiation and maintenance of nutrition to avoid refeeding syndrome.
- HER offers detailed recommendations on non-oral medication options and weaning strategies.

HER ALGORITHM	ACOG GUIDELINES	COMMENTS
B6/Pyridoxine 10–25 mg PO with or without Doxylamine 10-25 mg 3 or 4 times per day.	Vitamin B6 (pyridoxine) 20 mg/Doxylamine 20 mg up to 2 tablets per day	HER uses recommended B6 dosing per research.
Thiamin 100 mg PO 1-3x per day	No specifics for PO or prevention	Prevents beriberi & Wernicke's.
Continue prenatal vitamin as tolerated then change to key individual vitamins.	• Take prenatal vitamins for 1 month before pregnancy • Convert prenatal to folic acid only	Few with HG tolerate prenatals. Folic acid is critical before NVP is severe.
Antihistamine (d/c doxylamine) • Dimenhydrinate 25-50 mg q 4–6 hours PO or PR (limit to 200 mg per day if taking doxylamine) • Diphenhydramine 25–50 mg PO q 4–6 hours • Meclizine or Cyclizine 25 mg PO q 6-8 hours	• Dimenhydrinate, 25–50 mg q 4–6 hours, PO (not to exceed 200 mg per day if patient also is taking doxylamine) OR • Diphenhydramine, 25–50 mg PO q 4–6 hours	• Multiple antihistamines contraindicated for drowsiness and QT prolongation. • Most dosing the same. • HER suggests additional options to avoid drowsiness.
Dopamine Antagonist (Use only 1 at a time or alternate)	• Prochlorperazine, 25 mg q 12 hours rectally	• Metoclopramide ODT included on HER algorithm.

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• Metoclopramide 2.5-10 mg q 6-8 hours PO or ODT • Promethazine 25 mg q 4-6 hours PO or PR (avoid IM/IV) • Prochlorperazine 5-10 mg q 6-8 hours PO or 25 mg twice daily PR	OR • Promethazine, 12.5–25 mg q 4–6 hours, PO, rectally, IM ADD if no dehydration • Metoclopramide, 5–10 mg q 6–8 hours, PO/IM OR • Trimethobenzamide, 200 mg q 6–8 hours, IM	• Prochlorperazine oral only on HER algorithm. • Trimethobenzamide rarely effective so excluded by HER. • Dosages the same. • Intramuscular not recommended by HER. • HER offers additional routes.
1. Bowel Care: Stool softener, magnesium (citrate, oxide), polyethylene glycol + stimulant laxative or enema ≤3x/week prn. 2. Ondansetron 4-8 mg q 3-6 hours (not prn) PO or ODT, or ODT given vaginally (32 mg max) 3. Granisetron 1 mg q 12 hours PO or 3 mg TD patch	• Ondansetron, 4 mg PO q 8 hours or ODT	• Bowel regimen critical to preventing constipation, hemorrhoids and impaction. • Vaginal administration of ODT meds on HER Algorithm. • Continuous, SubQ and TD therapy often extremely effective. • Frequent/alternate dosing on HER's algorithm.
Mirtazapine 15 mg q 8 hours PO or ODT (Dose not established for HG.)	Not included	Some report this is the only medication that works to avoid termination.
Methylprednisolone (if 9+ weeks) 16 mg q 8 hours PO or IV for 3 days. Taper over 2 weeks. Maintain on lowest effective dose if needed.	Methylprednisolone 16 mg q 8 hours, PO or IV, for 3 days. Taper over 2 weeks to lowest effective dose.	Dosing regimen same.
Chlorpromazine 25–50 mg IV or 10–25 mg PO q 4-6 hours	Chlorpromazine 25–50 mg IV/IM or 10–25 mg PO q 4-6 hours.	Dosing same. Routes differ.
GERD or gastric/esophageal protection: 1. Calcium Antacid AND/OR 2. H2 antagonist BID: famotidine 20-40 mg PO AND/OR 3. Proton Pump Inhibitor (PPI) q 24 hours at bedtime	Gastric ulcer mentioned in differential diagnosis	Prevention in HER algorithm. Esophageal erosion and rupture can be fatal. Many have severe oral damage and GI ulcers as well.
1. Thiamin 100-500 mg IV 3x day 2. NS or LR + MVI + B1 + B Complex (B1, B2, B3, B6, B9) • Add prn: KCl, Na, Vitamin K, Vitamin D, Zn, Se, Fe, Mg & Ca.	• Thiamine 100 mg IV with initial rehydration fluid and 100 mg qD x 2–3 days (followed by IV MVI)… [if vomiting] for more than 3 weeks. • IV hydration if cannot tolerate oral liquids for a prolonged period or if clinical signs of dehydration. Correction of ketosis and vitamin deficiency should be strongly considered. Dextrose and vitamins should be included when prolonged vomiting, and B1 should be administered before dextrose.	• HER offers guidance on when and which other vitamins are important. Some are required to metabolize thiamin. • HER includes recommended 200 mg B1 for D5/D10 IV. • Vitamin K included in HER algorithm because hemorrhage and vitamin K embryopathy reported and seen. • Regular B1 included in HER for prevention of B1 sequelae.

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If oral meds ineffective or not tolerated, change to ONE OF THE FOLLOWING with bowel care: 1. Ondansetron: • IV: 4-8 mg over 15 minutes q 6 hours or continuous infusion • Subcutaneous (SubQ) continuous infusion: 8 mg starting dose, then 12-40 mg/day; wean slowly 2. Granisetron 1mg q 12 hours IV or continuous infusion If needed, add one or both: 3. Dimenhydrinate or Diphenhydramine 25-50 mg q 4–6 hours IV 4. Metoclopramide: • IV: 5–10 mg q 8 hours SLOW infusion • SubQ continuous infusion: 5-10 mg starting dose, then 20-60 mg/day	If Dehydrated: • Ondansetron, 8 mg, over 15 minutes, q 12 hours, IV OR • Dimenhydrinate, 50 mg q 4–6 hours, IV OR • Metoclopramide, 5–10 mg q 8 hours, IV OR • Promethazine, 12.5–25 mg q 4–6 hours, IV • transdermal patch (granisetron) mentioned • “limited evidence regarding subcutaneous microinfusion pumps for metoclopramide or ondansetron”	• Ondansetron has half-life of 3.5 hours and lasts about 6 hours so 8-12 hour dosing is *highly* ineffective. • Metoclopramide is often given IV push resulting in panic attacks and even termination. • Granisetron dosing is not included but granisetron is metabolized differently and can be more effective. • Combining antihistamines with ondansetron and other medications can often be crucial to controlling HG. • Continuous infusions can be highly effective versus peaks and troughs. • HER includes alternates when side-effects necessitate change. • HER includes dosing and weaning specifics.
NUTRITION - If weight loss ≥7% and/or persistent HG, consult with GI & Nutrition & IV Therapy: 1. Enteral therapy: Gradually increase with or without additional parenteral/enteral fluids. (NJ or J/G-tube preferred). Insert SMALL bore nasal tube under sedation. 2. IV fluids and/or parenteral nutrition • Prevent Refeeding Syndrome: Slowly restart & monitor weight, cardiac rhythm and electrolytes (especially phosphorus!). • Continue until gaining weight on PO intake and meds.	“Enteral tube feeding (nasogastric or nasoduodenal) should be … the first-line treatment to provide nutritional … if not responsive to medical therapy and cannot maintain her weight… consider enteral nutrition if dehydration or persistent weight loss is noted.” “Total parenteral nutrition has been described” for women who cannot tolerate enteral tube feedings.	• HER offers specific guidelines on initiating and discontinuing nutrition. Currently <20% of patients receive nutrition, and few receive adequate B1 and MVI. • Refeeding syndrome is mentioned in HER guidelines because HG patients are high risk, and it is documented in HG patients. • Nutrition guidelines per research and ASPEN. • Additional practical strategies for nutritional therapy in HG.
EKG monitoring	EKG monitoring	HER gives guidelines.
Hydroxyzine excluded	Hydroxyzine contraindicated with Zofran	Not available IV. Helpful for sleep.
Consider midline or central line for frequent IVs.	Peripherally inserted central catheters (PICCs) can be used.	Midlines included on HER algorithm; helpful for shorter term usage and home care. Some research finds it safer than PICC.

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NAUSEA/VOMITING OF PREGNANCY ALGORITHM

(HELP <20)

1. B6/Pyridoxine 10–25 mg PO with or without Doxylamine 10-25 mg 3 or 4 times per day. (Either separately or as delayed release combination.)
2. Thiamin/Benfotiamine 100 mg PO 1-3 times per day. (250 mg daily PO minimum after 20 weeks)
3. Continue prenatal vitamin if tolerated or change to single vitamins (B1, B9, D with K, Ca, Mg).
4. Add gastric/esophageal protection at bedtime with onset of vomiting or poor intake. (See shaded box below.)

DEHYDRATION?

(HELP <32)

Add up to 1 from each class:

1. Antihistamine (discontinue doxylamine)
   - *Dimenhydrinate* 25-50 mg q 4–6 hours PO or PR (limit to 200 mg per day if taking doxylamine)
   - *Diphenhydramine* 25–50 mg PO q 4–6 hours
   - *Meclizine* or *Cyclizine* 25 mg PO q 6-8 hours
2. Dopamine Antagonist (Use only 1 at a time or alternate.)
   - *Metoclopramide* 2.5-10 mg q 6-8 hours PO or ODT
   - *Promethazine* 25 mg q 4-6 hours PO or PR (avoid IM/IV)
   - *Prochlorperazine* 5-10 mg q 6-8 hours PO or 25 mg twice daily PR

Add scheduled bowel care option(s) and serotonin antagonist (strict schedule, NOT prn):

1. Bowel Care: Daily stool softener, magnesium (citrate, oxide), polyethylene glycol + stimulant laxative or enema up to 3x per week prn.
2. *Ondansetron* 4-8 mg q 3-6 hours PO or ODT, or ODT given vaginally (max 32 mg per day) ***OR***
3. *Granisetron* 1 mg q 12 hours PO or 3 mg TD patch (give 1 mg oral/IV dose on days 1 and 2 until steady state)
   NOTE: Monitor EKG if risk of QT prolongation.

Consider NUTRITION (see box on right) and one of the following:

1. *Mirtazapine* 15 mg q 8 hours PO or ODT (Dose not established for HG. Discontinue other serotonin antagonists.)
2. *Methylprednisolone* (if 9+ weeks) 16 mg q 8 hours PO or IV for 3 days. Taper over 2 weeks. Maintain on lowest effective dose if needed. Avoid administration exceeding 6 weeks.
3. *Chlorpromazine* 25–50 mg IV or 10–25 mg PO q 4-6 hours

GERD or gastric/esophageal protection options:

1. Calcium antacid (avoid Aluminum, Bismuth or Bicarbonate)
2. H2 antagonist BID: *famotidine* 20-40 mg PO
3. Proton Pump Inhibitor (PPI) q 24 hours at bedtime
   - *esomeprazole* 20-40 mg PO or IV
   - *lansoprazole* 15-30 mg PO or ODT
   - *pantoprazole* 40 mg PO or IV

(HELP ≥32)

IV fluids and dilute vitamins; infuse slowly:

1. NS or LR + MVI + B1 + B Complex (B1, B2, B3, B6, B9)
   - Add prn: KCl, Na, vit D, Zn, Se, Fe, Mg & Ca.
   - Always give 200 mg B1 with IV dextrose (prevent WE).
   - Slowly replace low/marginal electrolytes (prevent CPM).
   - Consider restricted PO intake for 24-72 hours (gut rest).
   - Consider midline or central line for frequent IVs.
2. **Always include Thiamin 100-500 mg IV 3 times daily.**
3. Choose MVI containing vitamin K or add vitamin K prn.

If oral meds ineffective or not tolerated, change to *ONE OF THE FOLLOWING with daily Bowel Care (see box on left):*

1. *Ondansetron*:
   - IV: 4-8 mg over 15 minutes q 3-6 hours (up to 32 mg) or continuous infusion
   - Subcutaneous (SubQ) continuous infusion: 8 mg starting dose, then 12-40 mg/day; wean slowly to PO if stable
2. *Granisetron* 1mg q 12 hours IV or continuous infusion or TD

If symptoms continue, add one or both of these meds:

1. *Dimenhydrinate* or *Diphenhydramine* 25-50 mg q 4–6 hours IV
2. *Metoclopramide*:
   - IV: 2.5–10 mg q 8 hours SLOW infusion
   - SubQ continuous infusion: 2.5-10 mg loading dose, then up to 60 mg/day

*** Wean IV/SubQ to PO very slowly when stable, then monitor for at least 24 hours before discharge to home.**

NUTRITION - If weight loss ≥7% and/or persistent HG:

1. Consult with GI & Nutrition & IV access team.
2. Prevent Refeeding Syndrome: Very slowly restart nutrition & closely monitor weight, cardiac rhythm and electrolytes (especially phosphate) for 1+ week.
3. Consider EN/PN until gaining weight on PO intake.
   - *Enteral nutrition*: Gradually increase infusion (after resting GI tract) with or without additional parenteral/enteral fluids. (NJ or G/J-tube preferred). Insert SMALL bore nasal tube under sedation. Often poorly tolerated.
   - *Parenteral nutrition (partial peripheral or total central)*

IMPORTANT NOTES:

1. If symptoms persist, follow arrows to next level of care and consider non-oral forms of medications such as compounded, transdermal, IV, or SubQ. ALWAYS wean medications very slowly.
2. After IV therapy, use non-oral options or move slowly to oral medications as tolerated.
3. Most medications can cause QT prolongation, consider EKG or cardiac monitoring for high risk patients, high doses of medications, multiple medications, or electrolyte & vit B1 abnormalities.
4. Intramuscular injections (IM) not recommended due to muscle atrophy and pain sensitivity.
5. Dehydration and nutrient (e.g. electrolytes, B1) deficiencies decrease treatment response.
6. Start prophylactic anticoagulation if prolonged immobility or hospitalization over 72 hours.
7. Weaning too early or rapidly may result in worsening or refractory symptoms.
8. See less common medications on the HER Foundation website: www.hyperemesis.org/meds.
9. HELP = HyperEmesis Level Prediction Score. Learn more: www.hyperemesis.org/tools.

Disclaimer: This is not medical advice. Do not change your diet, treatment or lifestyle without consultation from your medical provider.

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