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Pharmacy Newsletter : April 2015

Pharmacy Department
Aga Khan University Hospital

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Pharmacy Newsletter provides information regarding the decisions of P & TC, current concepts in drug therapy, warnings and cautions issued by various regulatory agencies, drug interactions, ADRs and matters related to drug usage.

Opinions expressed are of authors and does not necessarily represent AKUH's view/recommendations.
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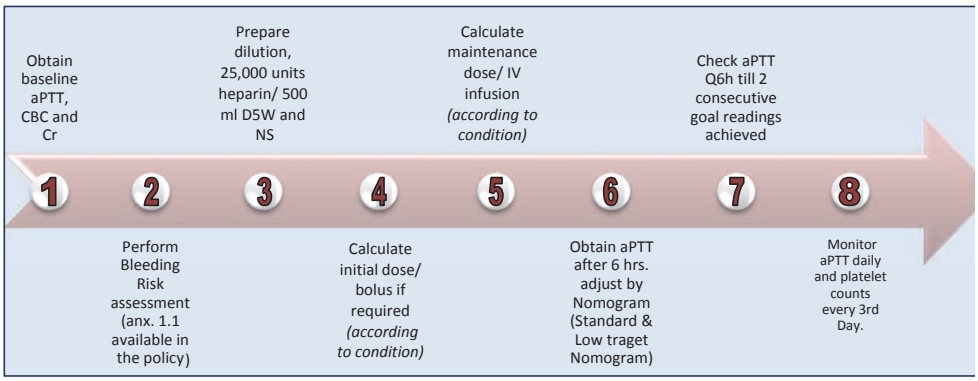
Inside this Issue:

Medication Safety Alert | AKUH Un-fractioned Heparin Usage Guideline for Systemic Anticoagulation in Adults

Hafsah M. Ashfaq, Pharmacist

High alert medications are an essential component of drug therapy, but they carry a significant risk of causing serious injuries or death to patients if used in error. Anticoagulants are also among "High Alert Medications." Unfractionated heparin, low-molecular weight heparin, and warfarin are the frequently used anticoagulants. When used or omitted in error, anticoagulants can cause life-threatening or fatal bleeding or thrombosis. The Aga Khan University hospital developed guideline that is implemented in all the patient care areas including ER in order to standardize the usage and monitoring of Heparin. The ***highlights*** of guideline are as follows:



Flow Chart for Heparin Protocol:

Consult hematologist before starting Heparin if:

- Epidural catheter in place
- Platelets < $50x10^9$/L
- aPTT > 79 seconds
- DIC, TTP or HIT
- Active bleeding

Bolus:

DVT/PE = 80 units/kg IV push (rounded to nearest 1000) Max. Dose = 10,000 units.
TIA, ACS, MI & ischemic CVA = 60 units/kg IV push (rounded to nearest 1000) Max. Dose= 5000 units.

Infusion:

DVT/PE = 18 units/kg/hr (Max initial rate is 2250 units/hr)
TIA, ACS, MI & ischemic CVA = 12 units/kg/hr (Max initial rate is 1000 units/hr)

Goal of Therapy/Target:

Until target aPTT is reached, labs are checked every 3-6 hours as per nomogram and corresponding dose is adjusted or hold as applicable.

a. Standard Target indications (aPTT 50-80 sec):

Atrial fibrillation, VTE (DVT/PE), Arterial thromboembolism, Peripheral vascular disease, Mechanical valve.

b. Low Target Indications (aPTT 50-60 sec):

Patients > 70 years of age, pulmonary hypertension, ischemic stroke in patients with atrial fibrillation, patients with ACS, patients receiving GPIIb-IIIa inhibitors or fibrinolytics.

Alerts:

- Bleeding risk assessment is to be done by resident before starting therapy
- Resident of a primary team will review heparin infusion order as per protocol (6hrly/ 3hrly)
- Nurse will document the Date, Time of aPTT test & result on Heparin Infusion protocol worksheet as per protocol (6hrly/ 3hrly). A nurse signature is required on the worksheet
- Any adjustment in dose will be done by resident of a primary team only. A resident signature is required on the worksheet
- If aPTT >120 sec nurse will hold infusion and immediately inform resident and/or senior resident of a primary team.
- Recommended lab monitoring is to be done (aPTT daily 6 hrly, Platelets count every 3rd day)
- Clinical monitoring (bruises, bleeding, hematoma, neurological status); every shift
- Follow guideline while switching Heparin to/from other anticoagulants (Warfarin, Enoxaparin, Fondaparinux, Rivaroxaban etc.). Gap of required hours must be maintained
- Pharmacy will ensure that 2 anticoagulants are not dispensed together to the same patient
- Avoid concomitant LMWH administration
- Physician should delay heparin order as per below mentioned conditions. In case of deviation, attending physician and/or team resident will contact pharmacy directly:
  - ✓ Tirofiban given in less than last 4-8 hrs
  - ✓ LMWH given in less than last 6 hrs
  - ✓ Streptokinase in less than last 24 hrs
  - ✓ Alteplase in less than last 24 hrs
- Infusion will be prepared and dispensed by Pharmacy after checking aPTT.
- Standard dilution is 25000 units heparin per 500 ml D5W or NS i.e. 50 units/ml

Note: ***The Reversal of Heparin overdose & Transition to other anticoagulants*** are described in the Heparin Guidelines. Details will soon be available on: http://portal.aku.edu/jcia/jcia-cpg.asp

FDA Drug Safety Podcast of the Year 2014

Sadaf Gul, Pharmacist

S. No.	Date	Drug	The Podcast
1	**December 11th**	*Ziprasidone*	***Ziprasidone*** may cause Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS) which starts with a rash leading to swollen lymph nodes, high eosinophil counts, inflammation of organs and even death.
2	**November 16th**	*Aspirin + Prasugrel/Clopidogrel*	A Clinical trial is being evaluated which showed 30 months therapy with ***dual antiplatelet*** has decreased risk of heart attacks and clot formation in stents, but an increased risk of death as compared to 12 months therapy.
3	**September 26th**	*Omalizumab*	The warning that ***Xolair***, when used in the treatment of asthma, may cause problems in the blood vessels supplying to the brain has been added to the label.
4	**June 26th**	*Lidocaine 2%*	A box warning to Oral viscous ***Lidocaine 2%*** solution will soon be added to the label. Its use for teething pain in infants and young children can cause serious harm, including death.
5	**June 25th**	*Topical Acne Products*	Certain OTC ***topical acne products*** can cause rare but potentially life-threatening allergic reactions or severe irritation. Consumers should seek medical attention if they experience such reaction.
6	**June 24th**	*Olmesartan*	There is no clear evidence of increased cardiovascular risks with the use of ***Olmesartan*** in diabetic patients.
7	**June 20th**	*Docetaxel*	The intravenous ***Docetaxel*** contains ethanol. Patients may experience intoxication during and after treatment.
8	**June 19th**	*Testosterone Products*	Manufacturers of ***Testosterone Products*** are required to include a general warning about the risk of venous thromboembolism, including DVT and PE, on the labels.
9	**April 23rd**	*Corticosteroid*	Warnings about serious adverse effects like loss of vision, stroke, paralysis and death with the use of epidural Corticosteroids are to be added to the label.
10	**March 31th**	*Sildenafil*	It was clarified that ***Sildenafil*** is approved to treat Pulmonary Arterial Hypertension in adults, not in children.
11	**January 31st**	*Testosterone Products*	Risk of stroke, heart attack, and death with use of FDA approved ***testosterone products*** is being investigated.
12	**January 8th**	*Sodium Phosphate Drugs*	More than one dose of ***Sodium Phosphate*** in a day can cause harm to the kidneys, heart, and even death. **High Risk Patients**: Children under 5 (Oral form), under 2 years (Rectal Form), > 55 years old; Dehydrated, renal compromised, Bowel Obstruction/inflamed and those on nephrotoxic drugs (NSAID, ARBs, ACEI, etc.)

Reference: *http://www.fda.gov/Drugs/DrugSafety/DrugSafetyPodcasts/*
**Table includes only the podcast of those drugs available at local market.*

Resuscitation Fluids in Critical Illness

Kashif Hussain, Clinical Specialist

Resuscitation fluids may be the most common intervention in critical car. However, there is scarce evidence to guide the best use of resuscitation fluids in the ICU.

Resuscitation Fluids in the ICU: Pearls

- There is no such thing as an ideal resuscitation fluid; they each have flaws, and none has been demonstrated superior to the others in effectiveness or safety.
- Any resuscitation fluid can contribute to interstitial edema, which may have detrimental effects on ventilator weaning, cardiovascular function, wound healing, or other outcomes.
- Although colloids have been believed to have superior "volume-expanding" effects over crystalloids, any advantage of colloids in hemodynamic response appears to be minimal in practice.
- Normal saline given in large quantities can cause a hyperchloremic metabolic acidosis, and has been associated with renal injury.
- Hydroxyethyl starches (HES) have harmful effects in many critically ill patients, and there seems to be little justification for their continued use, or for other semisynthetic colloid solutions.
- Albumin appears safe and may be helpful in early sepsis, but has no definite advantages, and is too expensive to recommend as a standard resuscitation fluid.
- Hypertonic saline (used to avoid producing edema) has not yet been proven safe.

Saline is Not Normal (But it is cheap and effective)

Saline's designation as "normal" was based on an erroneous calculation of the salt concentration in blood as 0.9% back in 1882 (it's actually 0.6%). Saline is nearly isotonic with extracellular fluid, but frequently causes a hyperchloremic metabolic acidosis; the excess chloride has been blamed for immune and renal function. It's also a common reason for hypernatremia in hospitalized patients.

However, saline is cheap, and is an effective resuscitation fluid; it's by far the most widely used globally.

Resuscitation Fluids: What's inside?

	Albumin (20%)	Saline (0.9% NaCl)	Lactated Ringer's	Plasma-Lyte
Sodium (Na)	145 mmol/L	154 mmol/L	130 mmol/L	140 mmol/L
Chloride (Cl)	128 mmol/L	154 mmol/L	109 mmol/L	98 mmol/L
Potassium (K)	none	none	4 mmol/L	5 mmol/L
Calcium (Ca)	none	none	1.5 mmol/L	none
Magnesium (Mg)	none	none	none	3 mmol/L
Lactate	none	none	28 meq (28 mmol/L)	none
Acetate	none	none	none	27 mmol/L
Gluconate	none	none	none	23 mmol/L
Tonicity	250 mOsml/L	308 mOsm/L	280 mOsm/L	Isotonic (294 mOsm/L)

Albumin as a Resuscitation Fluid

Albumin has hemodynamic advantages over crystalloid solutions as a volume-expanding resuscitation fluid. Physiologic studies have suggested a 1:3 ratio of albumin to crystalloid to achieve the same intravascular volume. Some consider albumin a wise choice as a resuscitation fluid for patients considered to be more at risk for volume overload (e.g., congestive heart failure, liver failure, or end-stage-renal disease). Given its narrow margin of benefit, albumin is too expensive to be recommended as a standard resuscitation fluid.

Operational Quality and Patient Safety Indicators – 2014

Hafsah M. Ashfaq – Pharmacist

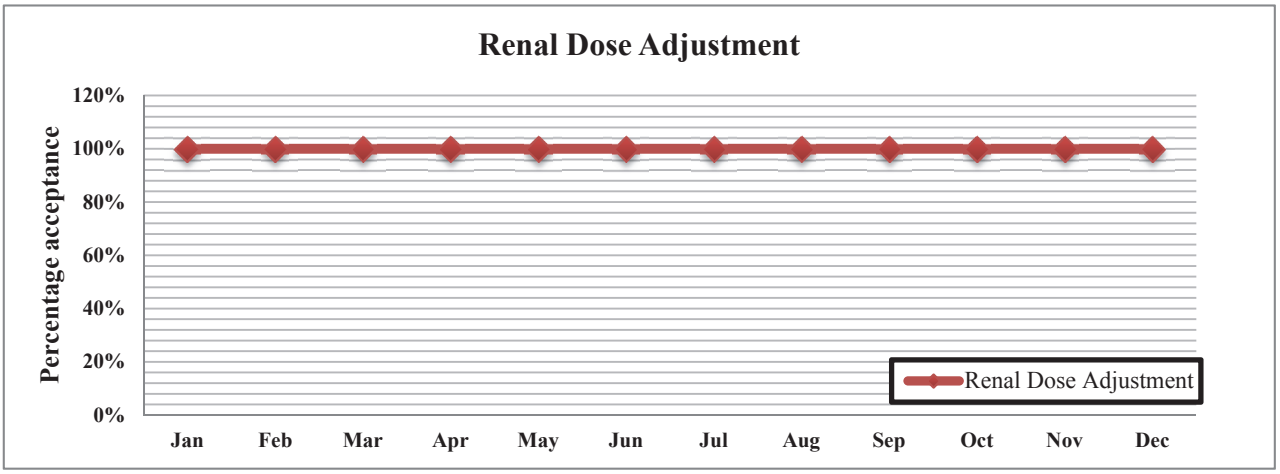
The quality indicators are measures of hospital quality and safety drawn from readily available hospital inpatient data. Hospitals use Quality Indicators (QIs) to identify potential concerns about quality and safety and track their performance over time. The indicator which Drug & Poison Information Centre (DPIC), Department of Pharmacy Services, AKUH uses to track the performance includes:

- Renal Dose Adjustment
- Carbapenem Interchange policy
- IV to PO Switch
- Therapeutic Drug Monitoring (TDM) of narrow therapeutic index drugs
- ADR identification through Triggers & Markers

Pharmacist at Drug & poison information center (DPIC) performs these activities daily and intervenes according to recommendation from different guidelines & resources.

- **Renal Dose adjustment** is a major component of the operational quality indicators. Kidneys are the major route of elimination for most of the drugs. In patients with renal impairment, CKD or AKI accumulation of drug metabolites can cause adverse drug reactions, so the dosages must be adjusted according to renal function.

Patient having deranged creatinine are searched daily and their doses are adjusted according to creatinine clearance and during the last year **100%** interventions accepted for renal dose adjustment.

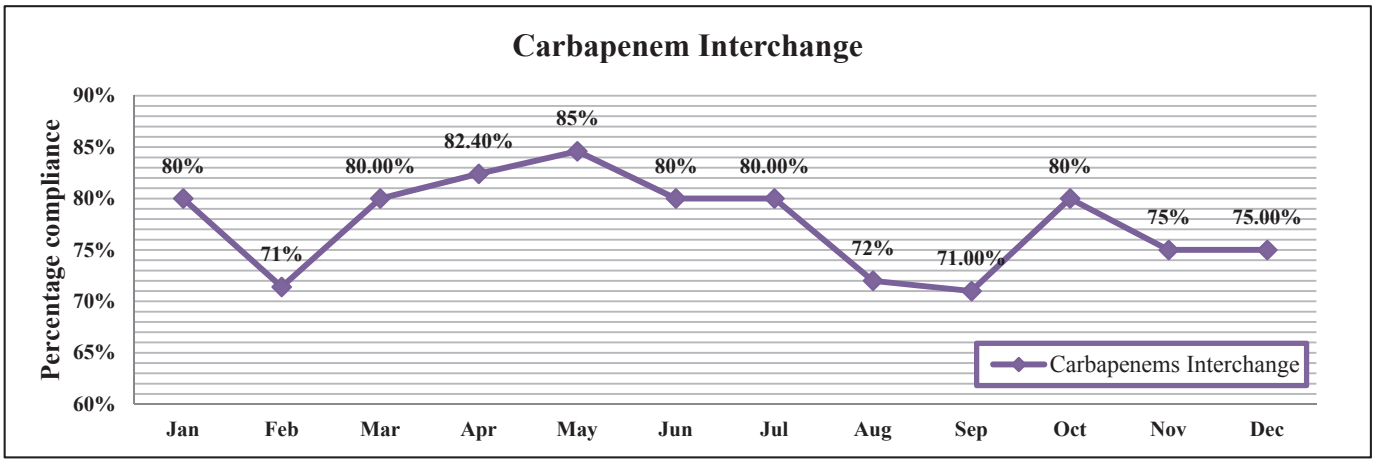


- **Carbapenem interchange** policy has been approved by Antibiotics Subcommittee as well as Hospital Pharmacy and Therapeutic Committee (P & TC), an oversight committee of the Antibiotics Subcommittee. Primary reasons have been the cost per gram of the Meropenem (estimated savings of Rs.1500-2000 per day depending on dose), identical and similarity of spectrum and usage in approved indication.

Exclusion criteria (Meropenem indication):

- Pediatric age group
- Known case of epilepsy or having seizures
- CNS infections
- Head trauma/injury (conditions in which seizure threshold may decrease)

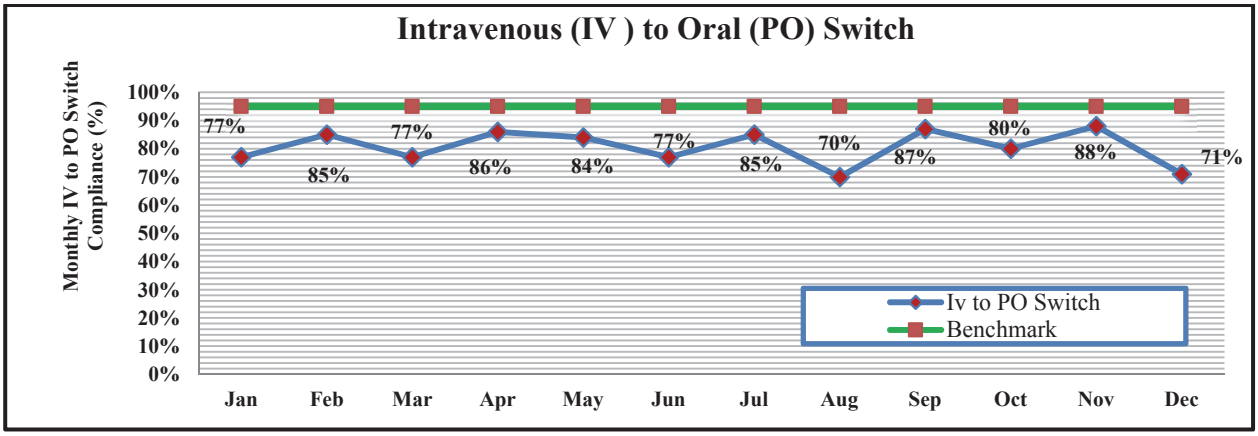
All the patients on Meropenem (except the exclusions mentioned above) are reviewed and advised for switching from Meropenem to Imipenem. Below is the graphical representation of percentage compliance in the Year 2014.



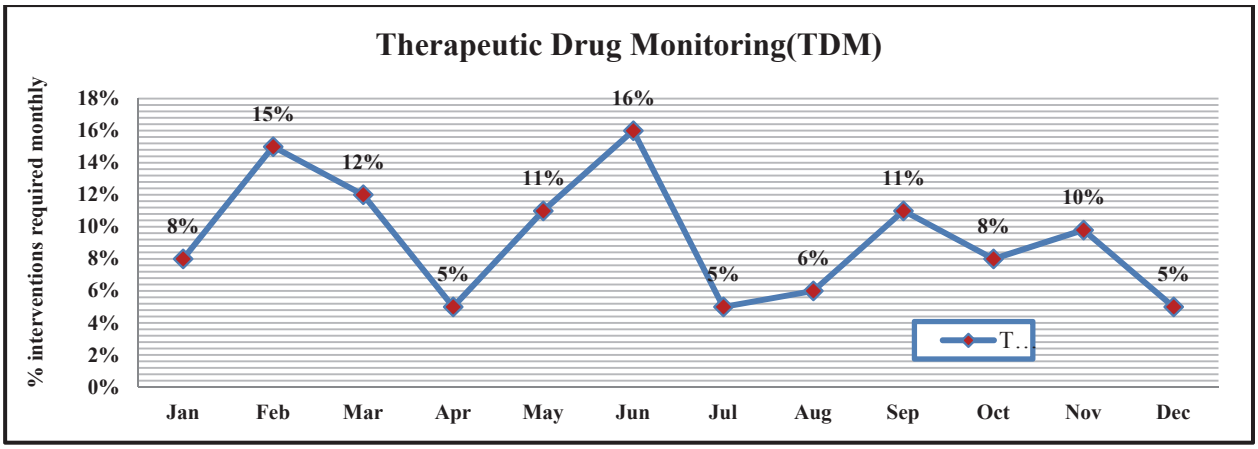
- **IV to PO switch** is the prompt conversion of IV antibiotic therapy to Oral. Patients may be considered candidates for switching from IV to Oral therapy once the patient has shown clinical improvement and is medically stable. It helps in:

  - Reduction in the likelihood of hospital acquired bacteremia and infected/phlebitic IV lines.
  - Saves both medical and nursing time
  - Earlier hospital discharge.
  - Significantly reduce treatment costs.
  - Potential reduction in the risk of adverse effects; errors in preparation are significantly higher with parenteral drugs, compared to oral formulation

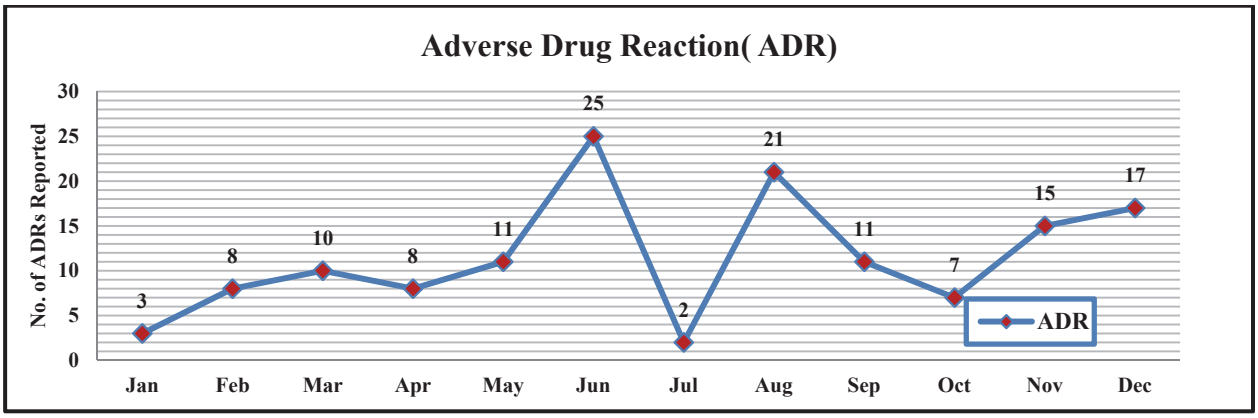
  Medicines that have more than 80% oral bioavailability are switched from IV to PO.
  All the patients on selected drugs are reviewed according to the criteria defined and suggested to shift from IV to PO route. The graph below shows the compliance rate for the year 2014.



- **Therapeutic drug monitoring** is necessary for the narrow therapeutic index drugs to evaluate their doses and therapeutic response. Narrow therapeutic drug have narrow margin of safety so it is recommended to monitor their serum concentration prior to direct clinical observation. Drugs included in TDM are digoxin, theophylline, warfarin & Phenytoin. Pharmacists check the profile and if required suggest the physician for proper time to draw drug levels. Below graph for last year shows the percentage of patients required interventions for doses to be changed with respect to the serum drug concentrations.



- **Triggers and Markers** Pharmacy maintains the record of adverse drug reactions reported and takes the follow up. On monthly basis summary of ADRs is prepared for review by P&TC to take necessary action for safety. Trigger and markers is an activity in which the tracking of an ADR is done by the stat shots of particular agents that are used to reduce the adverse effects produced by a certain drug e.g. IV Pheniramine for an allergic reaction produced by cephalosporin or IV protamine given for heparin overdose etc. Following are the numbers of ADRs reported to DPIC in year 2014.



Proud to Report

Polio Eradication Awareness Campaign

Pakistan is amongst the three countries where poliomyelitis (polio) is still categorized as an endemic. WHO advisory in month of April 2014 also impose that every traveler of Pakistan has to be vaccinated with polio vaccine. Department of Pharmacy Services, The Aga Khan University Hospital started Polio eradication campaign to spread awareness and to encourage public to participate in Government Polio Campaigns.

Pharmacy Staff Appreciation Evening, 2014

Pharmacy staff appreciation evening 2014 was held on Sunday 1st Feb, 2015 at the Sports and Rehabilitation Centre. At the event various thought provoking skits, songs and parodies were presented. Awards were distributed to the best nominees & outstanding achievers of 2014. A video title "Pharmacy achievements 2014" was especially made having the achievements of AKUH Pharmacy in 2014.

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