

Title of Clerkship:	<b>Nephrology Elective – UTMC (2 week)</b>
Elective Year(s):	Fourth
Department:	Internal Medicine
Type of Elective:	Clinical <input checked="" type="checkbox"/> Non-Clinical/Research <input type="checkbox"/> Basic Science <input type="checkbox"/>
Clerkship Site:	The University of Toledo Medical Center
Course Number:	MEDI734
Blocks Available:	All
Number of Students per Block:	2
Faculty:	Deepak Malhotra, M.D., Ph.D., Dinkar Kaw, M.D., Shobha Ratnam, M.D., Sandeep Vetteth, M.D.
Elective Description / Requirements:	This elective consists of a mixture of acting internship inpatient consultation, and outpatient experiences. The student will have primary and/or consultative responsibility for patients who have a variety of acid-base and electrolyte disorders and problems in clinical nephrology and renal transplantation. The principal method of learning will be problem-based case analysis on inpatient/consultative rounds. The student will be directed to do in depth reading regarding his patients and selected topics. In addition, ad hoc seminars on relevant topics will be scheduled for the members of the Nephrology Service.
Length of Clerkship:	2 weeks
<u>Links to Core Competencies</u> PC-8, PC-10	<u>Educational Course Objectives</u> <i>After completing the rotation, the student will be able to:</i> Process: Perceive problems in ill-structured clinical cases. Formulate Hypothesis(es) Based on Problems: 1. Test hypothesis(es) on a logical basis 2. Proposes therapeutic plan based on above analysis. 3. Re-evaluate hypothesis on basis of test results and/or response to treatment. 4. Search out basic science and clinical literature relevant to problem at hand. 5. Self-evaluate and become a self-directed learner.
PC-4	Skills: 1. Perform a careful analysis of urine sediment in the context of a clinical problem. 2. Write a concise consultation note clearly identifying the most likely diagnosis and therapeutic recommendations.
PC-3, PC4	Behaviors/Attitudes: 1. Perform a considerate examination and evaluation of the patient. 2. Explain to the patient and family members where appropriate the nature of the patient's condition and the patient's choices including: risks, benefits, and alternatives.
MK-1, MK-2, MK-4, MK-7, PC-7, PC-8	Cognitive Objectives: 1. Hyponatremia/Hypermnatremia/Body Fluids <ol style="list-style-type: none"> <li>Describe the body control of sodium and water balance.</li> <li>Explain the ways sodium and water balance is independent and the ways they are dependent.</li> <li>Characterize from clinical information the patient's total body sodium (effective extra- cellular fluid volume) status.</li> <li>Distinguish true hypotonicity from pseudohyponatremia.</li> </ol>

- d. Order diagnostic tests and interpret to determine pathogenesis of hyponatremia.
  - f. Prescribe fluids appropriate to clinical information.
  - e. Estimate water deficit from clinical information and prescribe fluids.
  - f. Evaluate edematous patient for pathogenesis and prescribe appropriate treatment.
2. Potassium Balance/Hypokalemia/Hyperkalemia
  - a. Describe body balance of potassium.
  - b. From clinical information determine differential diagnosis for hypokalemic state. Propose diagnostic tests to confirm diagnosis and recommend treatment.
  - c. Distinguish pseudohyperkalemia from hyperkalemia, describe tests required to confirm impression.
  - d. From clinical information determine the differential diagnosis of hyperkalemic state, propose tests to confirm pathogenesis and prescribe treatment.
  - e. Describe the emergency treatment of hyperkalemia, mechanisms of action, relative speed and efficacy.
3. Simple Acid-Base Disorders
  - a. Describe buffering system of the body and explain why bicarbonate is a good buffer to maintain pH at 7.4 in vivo but a poor buffer in vitro at the pH.
  - b. Describe the body balance of  $H^+$ ,  $HCO_3^-$ , and  $CO_2$  for the body and describe the generation, elimination and measurement of these substances. Explain the differences between total  $CO_2$ ,  $pCO_2$ ,  $HCO_3^-$ .
  - c. Identify the 4 simple acid-base disturbances from clinical information.
  - d. Describe compensatory mechanisms for each simple disturbance.
  - e. Explain why the Henderson-Hasselbalch Equation (ionization constant) does not predict the compensation expected.
  - f. List 5 causes for each simple acid-base disturbance.
  - g. Explain the difference between alkalemia and acidosis.
  - h. Explain how perpetuating factors make it difficult for the body to homeostatically correct metabolic alkalosis in the face of volume depletion.
  - i. Describe the treatment of each of the primary acid-base disturbances. Calculate the dosages of bicarbonate for metabolic acidosis.
4. Complex (Mixed) Acid-Base Disorders
  - a. Explain the difference between simple and complex (or mixed) acid-base disturbances.
  - b. Explain what predicted compensations.
  - c. Explain why compensation never obliterates the primary acid-base disturbances.
  - d. Identify mixed (or complex) acid-base disturbances from clinical material with the aid of confidence bands for simple disturbances.
  - e. Propose treatment for mixed acid-base disturbances based on an understanding of the pathophysiology.
5. Acute Renal Failure
  - a. Differential Diagnosis
  - b. Treatment
6. Chronic Renal Failure
  - a. Search for reversible causes
  - b. Management
7. Dietary
8. Dialysis options
9. Renal Transplantation
10. Interstitial nephritis
11. Cystic Diseases of the Kidney
12. Hypertension

### 13. Evaluation and Treatment of other Common Clinical Disorders

- a. Proteinuria
- b. Obstructive Uropathy
- c. Urinary Tract Infections

UT/COM students will meet or exceed the institutional standards for professionalism as stated in the current Educational Program Objectives and the current Educational Course Objectives for the Sponsoring Department.

Instructional Methods: Small group – clinical skills  
Interpretation of lab data  
Diagnostic tests – use/interpretation  
Lecture/media  
Independent study  
Outpatient rounds  
Inpatient rounds

Evaluation Methods Employed: Attendance  
Case presentation  
Case write-up  
Faculty/resident evaluation  
Narrative

Prerequisites: Successful completion of required Internal Medicine Clerkship

Clerkship Director: Christopher Lynn, M.D.

Clerkship Coordinator: Dawn D. Jagodzinski  
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Special Requirements: None