The Reform And Practice Of Case-Based Classroom Teaching In Physiology For Clinical Medicine Major

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Background

1. The characteristics of physiology require the integration of physiology teaching and clinical cases
2. Teaching method for case-based teaching should be diversified in order to achieve good results
3. Through teaching, I deeply realize that the current teaching mode in our school needs to be improved

Research content and scheme

1. Set research object
2. Determine the clinical cases in the case-based classroom teaching
3. Define the main method of case-based teaching
4. Try to diversify the components of teaching evaluation system

Research object — Students of clinical medicine (Grade 2017 and 2018)

Teaching content

Chapter	Joint point	Teaching content
4. Blood circulation	Regulation of cardiovascular system	Hypovolemic shock
8. urine formation and excretion	Regulation of Urine formation	ADH hypersecretion
10. Function of the nervous system	Activities on Neuromuscular Junction	Myasthenia gravis
11. Endocrine	Regulation of thyroid function	Graves' Disease

Teaching method

Analytical teaching： Clinical cases taught by teachers

Problem based Teaching：Teachers ask questions and students learn the answers by themselves

Making micro video：For a certain knowledge point in the form of lectures

Teachers guide students to write popular science articles and reviews

CASE: Hypovolemic Shock: Regulation of Blood Pressure

- Mavis Byrne is a 78-year-old widow who was brought to the emergency room one evening by her sister. Early in the day, Mrs. Byrne had seen bright red blood in her stool, which she attributed to hemorrhoids. She continued with her daily activities: she cleaned her house in the morning, had lunch with friends, and volunteered in the afternoon as a “hugger” in the newborn intensive care unit. However, the bleeding continued all day, and by dinner time, she could no longer ignore it. Mrs. Byrne does not smoke or drink alcoholic beverages. She takes aspirin, as needed, for arthritis, sometimes up to 10 tablets daily.

CASE: Hypovolemic Shock: Regulation of Blood Pressure

In the emergency room, Mrs. Byrne was light-headed, pale, cold, and very anxious. Her hematocrit was 29% (normal for women, 36 to 46%). Table 2-3 shows Mrs. Byrne's blood pressure and heart rate in the lying (supine) and upright (standing) positions.

table 2-3 Mrs. Byrne's Blood Pressure and Heart Rate

Parameter	Lying Down (Supine)	Upright (Standing)
Blood pressure	90/60	75/45
Heart rate	105 beats/min	135 beats/min

CASE: Hypovolemic Shock: Regulation of Blood Pressure

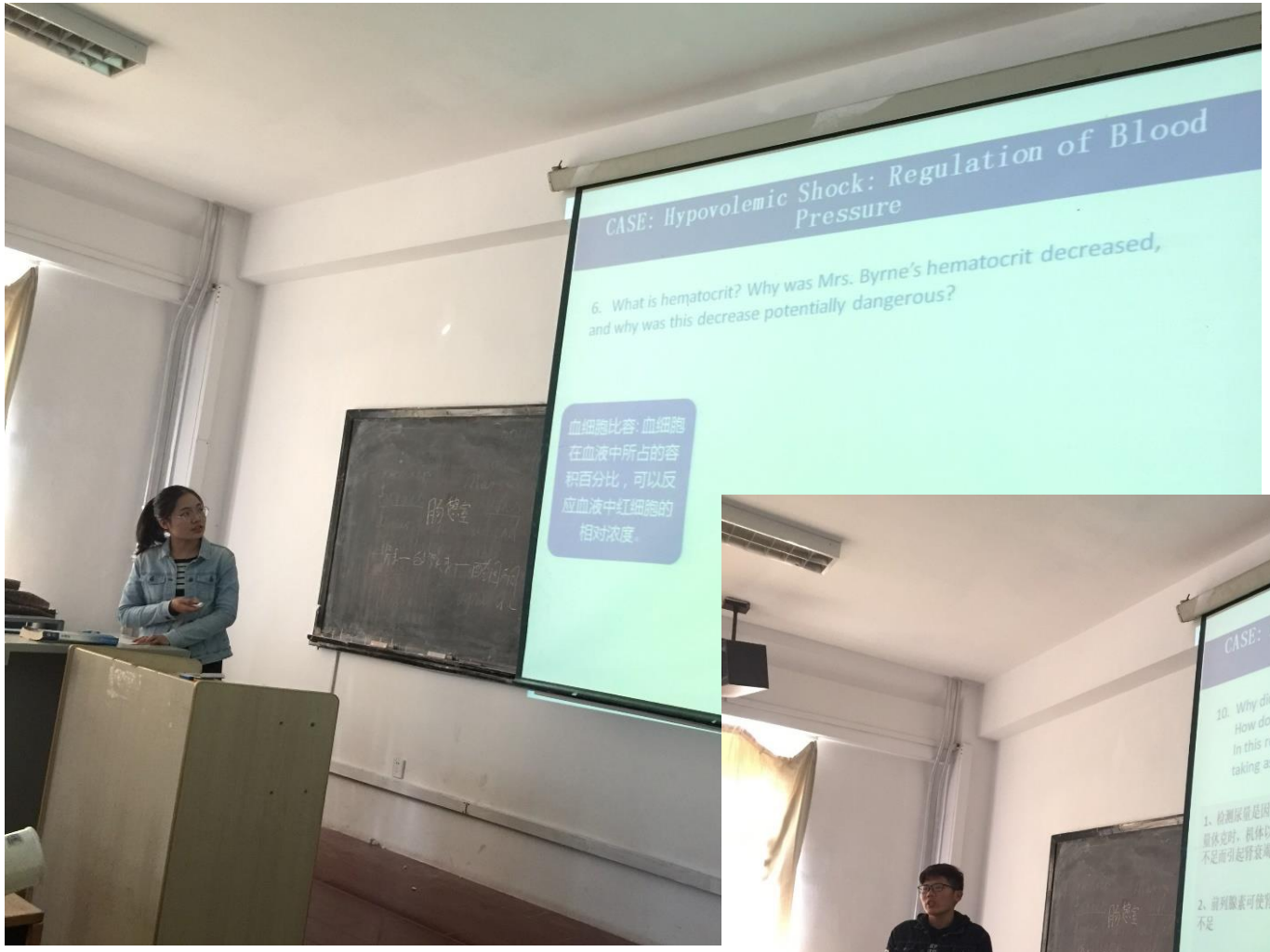
- An infusion of normal saline was started, and a blood sample was drawn to be typed and cross-matched to prepared for a blood transfusion. A colonoscopy showed that the bleeding came from herniations in the colonic wall, called diverticula. (When arteries in the colon wall rupture, bleeding can be quite vigorous.) By the time of the colonoscopy, the bleeding had stopped spontaneously. Because of the quantity of blood lost, Mrs. Byrne received two units of whole blood and was admitted for observation. The physicians were prepared to insert a bladder catheter to allow continuous monitoring of urine output. However, by the next morning, her normal color had returned, she was no longer light-headed, and her blood pressure, both lying and standing, had returned to normal. No additional treatment or monitoring was needed. Mrs. Byrne was discharged to the care of her sister and advised to “take it easy.”

Questions

1. What is the definition of circulatory shock? What are the major causes?
2. After the gastrointestinal blood loss, what sequence of events led to Mrs. Byrne's decreased arterial pressure?
3. Why was Mrs. Byrne's arterial pressure lower in the upright position than in the lying (supine) position?
4. Mrs. Byrne's heart rate was elevated (105 beats/min) when she was supine. Why? Why was her heart rate even more elevated (135 beats/min) when she was upright?
5. If central venous pressure and pulmonary capillary wedge pressure had been measured, would you expect their values to have been increased, decreased, or the same as in a healthy person?
6. What is hematocrit? Why was Mrs. Byrne's hematocrit decreased, and why was this decrease potentially dangerous?

Questions

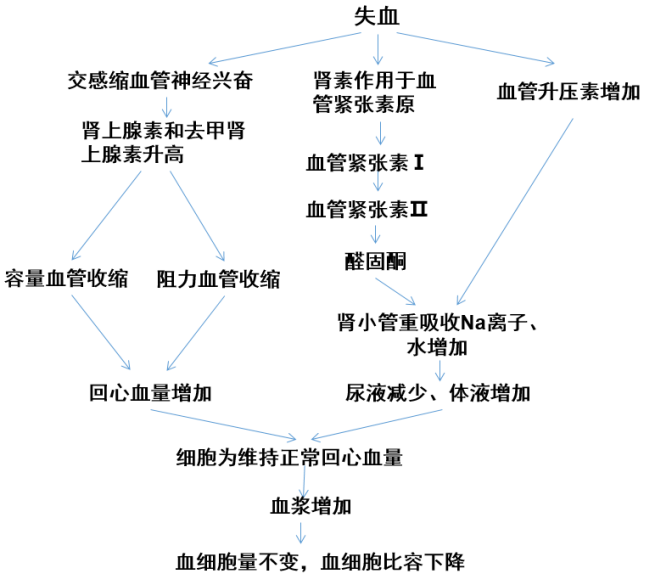
7. Why was her skin pale and cold?
8. If Mrs. Byrne's urinary Na^+ excretion had been measured, would you expect it to be higher than, lower than, or the same as that of a healthy person? Why?
9. How was the saline infusion expected to help her condition?
10. Why did the physicians consider monitoring her urine output? How do prostaglandins "protect" RBF after a hemorrhage? In this regard, why was it dangerous that Mrs. Byrne had been taking aspirin?
11. Had her blood loss been more severe, Mrs. Byrne might have received a low dose of dopamine, which has selective actions in various vascular beds. In cerebral, cardiac, renal, and mesenteric vascular beds, dopamine is a vasodilator; in muscle and cutaneous vascular beds, dopamine is a vasoconstrictor. Why is low-dose dopamine helpful in the treatment of hypovolemic shock?


CASE: Hypovolemic Shock: Regulation of Blood Pressure
6. What is hematocrit? Why was Mrs. Byrne's hematocrit decreased, and why was this decrease potentially dangerous?
血细胞比容：血细胞在血液中所占的容积百分比，可以反应血液中红细胞的相对浓度。


CASE: Hypovolemic Shock: Regulation
Pressure
10. Why did the physicians consider monitoring her urine output? How do prostaglandins "protect" RBF after a hemorrhage? In this regard, why was it dangerous that Mrs. Byrne had been taking aspirin?
1、检测尿量是因为尿量可间接的反映循环状态，也是反应肾灌注的较好指标。当低血
量休克时，机体以牺牲其他脏器供血为代价，优先保障脑，心脏的供血，肾的血供可
不足而引起肾衰竭。
2、前列腺素可使肾血管舒张，而是肾的血供增多，缓解低血容量休克休克引起的肾灌
不足
3、阿司匹林则通过抑制前列腺素的合成抑制血液凝固和血管舒张

6. What is hematocrit? Why was Mrs. Byrne's hematocrit decreased, and why was this decrease potentially dangerous?

Hematocrit: 血细胞比容，指血细胞在血液中所占的容积百分比，可反映红细胞在血液中的相对浓度。
The hematocrit (Ht or HCT), is the volume percentage of red blood cells in blood.



7. Why was her skin pale and cold?

低血容量
↓
有效循环血容量减少
↓
血压降低
↓
颈动脉窦、主动脉弓压力感受器传入冲动减少
↓
交感缩血管紧张增强
↓
选择性收缩皮肤、骨骼肌和内脏血管
使血液流向心脑等重要器官
↓
外周血管收缩、皮肤组织灌注不足 → 毛细血管血流量减少、充盈不足 → 皮肤苍白
↑
微循环障碍、代谢紊乱
↑
毛细血管渗出体液
↑
出冷汗、皮肤湿冷

Research object — Students of clinical medicine (Grade 2017 and 2018)

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1. Yang X, et al., Effect of estrogen on iron metabolism in mammals. Sheng Li Xue Bao. 2016 Oct; 68(5):637-643.

2. Chen X, et al., Potassium Channels: A Potential Therapeutic Target for Parkinson's Disease. Neurosci Bull. 2018 Apr; 34(2):341-348.

3. Dong D et al., Neuroprotective Effects of Brain-Gut Peptides: A Potential Therapy for Parkinson's Disease. Neurosci Bull. 2019 Jul.

4. Liu H et al., Lactoferrin protects against iron dysregulation, oxidative stress, and apoptosis in MPTP-induced Parkinson's disease in mice. J Neurochem. 2020 Feb.

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Teaching evaluation

Attendance 5%
Classroom performance 5%
case analysis 25%
Writing of popular science articles & reviews 10%
Interaction between teachers and students 5%
final exam 50%

Questionnaire on case based classroom teaching of Physiology（Grade 2017）

Investigation contents	是	否	不知道
Is it necessary to link the physiological theory with clinical cases	72（96%）	0	3
Does it enrich the teaching content and expand the thinking	72（96%）	1	2
Is it helpful to deepen the understanding and memory of the knowledge learned	70（93%）	3	2
Can interest in learning be stimulated	68（91%）	5	2
Does it mobilize the enthusiasm and initiative of learning	68（91%）	6	1
Is it helpful to cultivate clinical thinking ability	71（95%）	3	1
Is it helpful to cultivate self-study ability	73（97%）	1	1

Questionnaire on case based classroom teaching of Physiology（Grade 2018)

Investigation contents	是	否	不知道
Is it necessary to link the physiological theory with clinical cases	109（99%）	0	3
Does it enrich the teaching content and expand the thinking	107（99%）	1	2
Is it helpful to deepen the understanding and memory of the knowledge learned	107（97%）	3	2
Can interest in learning be stimulated	107（97%）	5	2
Does it mobilize the enthusiasm and initiative of learning	107（97%）	6	1
Is it helpful to cultivate clinical thinking ability	108（98%）	3	1
Is it helpful to cultivate self-study ability	109（99%）	1	1

临床医学专业生理学案例式课堂教学改革与实践

问卷调查

（2017级临床医学五年制）

调查内容	是	否	不知道
生理学理论教学是否有必要与临床案例联系	√		
是否丰富了教学内容，拓展了思路	√		
是否有助于加深对所学知识的理解和记忆	√		
是否能够激发学习兴趣	√		
是否调动学习的积极性与主动性	√		
是否有助于培养临床思维能力			√
是否有助于培养自学能力	√		

您对生理学案例式课堂教学有何建议？

多讲些案例

临床医学专业生理学案例式课堂教学改革与实践

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是否有助于培养自学能力	√		

您对生理学案例式课堂教学有何建议？

案例太少

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您对生理学案例式课堂教学有何建议？

加大比重

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您对生理学案例式课堂教学有何建议？

希望老师能对案例在学生准备过程中适时指导一下，案例分析增强了大家讨论能力，比心！

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您对生理学案例式课堂教学有何建议？

希望能多多讲解案例，将所学知识充分运用。老师与学生共同探讨问题。

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您对生理学案例式课堂教学有何建议？

无，这种教学方式很好。

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您对生理学案例式课堂教学有何建议？ 加油！！！

临床医学专业生理学案例式课堂教学改革与实践

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您对生理学案例式课堂教学有何建议？

继续开展

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您对生理学案例式课堂教学有何建议？

应该继续坚持

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您对生理学案例式课堂教学有何建议？

案例可以难度适中一些，第一，三次的各别问题难度有些大。

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您对生理学案例式课堂教学有何建议？

希望案例讨论尽可能在学期初而不是学期末临近期末考试开展。

希望以鼓励为主鼓励学生上课回答讨论（加分制）

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您对生理学案例式课堂教学有何建议？

在课时允许情况下，还希望在小组讨论讲解时可以互动组互动

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是否有助于培养自学能力			✓

您对生理学案例式课堂教学有何建议？

学生自主课下完成案例分课堂割离，完全课下查资料，可以与课堂更好有机结合，并给出标准答案的视频。

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不要在最后三周开展案例，最后要复习，比较忙

Overall objectives

Taking the national bilingual demonstration course of physiology as the platform

Clinical case is introduced into physiology teaching, Design a variety of teaching methods

Taking the advantages of physiology teachers as the resources

Creating case-based classroom teaching system

Innovative & qualified medical personnels

condition

pathway

aim


THANKS !