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EBPG（欧洲最佳实践指南）
血流动力学不稳定指南解读

医学及信息部—信息事务组

2019-06-12

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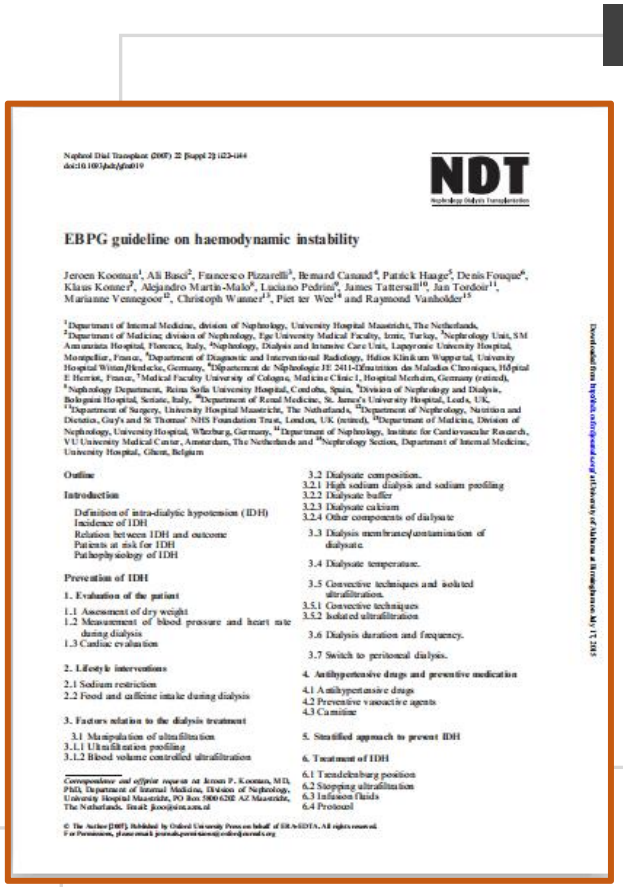
指南相关概述



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NDT

EBPG guideline on haemodynamic instability

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Outline

Introduction
- Definition of intra-dialytic hypotension (IDH)
- Incidence of IDH
- Relation between IDH and outcome
- Patients at risk for IDH
- Pathophysiology of IDH

Prevention of IDH

1. Evaluation of the patient
- 1.1 Assessment of dry weight
- 1.2 Measurement of blood pressure and heart rate during dialysis
- 1.3 Cardiac evaluation

2. Lifestyle interventions
- 2.1 Sodium restriction
- 2.2 Food and caffeine intake during dialysis

3. Factors relation to the dialysis treatment
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- 3.2.4 Other components of dialysate
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- 6.3 Infusion fluids
- 6.4 Protocol

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EBPG（欧洲最佳实践指南）
血流动力学不稳定指南

- ✓ ERA-EDTA（欧洲肾脏协会-欧洲透析移植协会）
- ✓ 出版时间：2007
- ✓ 杂志：Nephrology Dialysis Transplant

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➢ IDH 定义

Definition of intra-dialytic hypotension

In the literature, the definition of intra-dialytic hypotension (IDH) is not standardized and differs between various studies. Most definitions however, take into account either a relative or an absolute decline in blood pressure (BP) as well as the presence of specific symptoms. Although no evidence based recommendation regarding the definition of IDH can be given, the EBPG working group stresses that both a reduction in BP, as well as clinical symptoms with need for nursing intervention should be present in order to accept the presence of IDH. Moreover, the definition of IDH should ideally be equal in the literature and different treatment guidelines. Conforming to the K/DOQI guidelines, a proposed definition is a decrease in systolic BP ≥20 mmHg or a decrease in mean arterial pressure (MAP) by 10 mmHg associated with clinical events and need for nursing interventions.

根据K/DOQI指南（美国肾脏病与透析病人生存质量指导指南），建议的定义是：收缩压下降≥20mmHg，或平均动脉压(MAP)下降≥10mmHg，同时伴有临床事件的发生，并且需要干预。

IDH（透析中低血压）

➢ IDH 发生率

Incidence of IDH

In reviews, a 20% incidence of intra-dialytic hypotension is widely cited [1,2]. The reported incidence in cohort studies varies between 6% and 27% [3,4]. In the largest cohort reported so far, 10% of patients had frequent hypotensive episodes whereas 13% occasionally had hypotensive episodes [5]. The sensitivity for IDH may also vary among individual patients [6].

在综述中，透析中低血压发生率20%被广泛引用。研究中报道的发病率在6%到27%之间。在迄今报道的最大队列中，10%的患者有频繁的低血压发作，而13%的患者偶尔有低血压发作。对 IDH的敏感性也可能因人而异。

参考文献：Jeroen Kooman,,Ali Basci, Francesco Pizzarelli,,et. EBPG guideline on haemodynamic instability[J]. Nephrol Dial Transplant, 2007,22: ii22－ii44

存在IDH风险的患者

Patients at risk for IDH

Few large scale studies have addressed potential risk factors for IDH. The largest multi-centre cohort study was reported by Tisler *et al.* [1]. Of a cohort of 958 patients from 11 dialysis centres, 96 patients with frequent episodes of IDH were compared with 130 patients with occasional episodes of IDH. Age, female sex, presence of diabetes mellitus, hyperphosphataemia, presence of coronary artery disease, and renal diagnosis other than glomerulonephritis and the use of nitrates were significantly higher in patients with frequent IDH. In multivariate analysis, age, renal diagnosis other than glomerulonephritis, hyperphosphataemia and the use of nitrates were independent risk factors for IDH. In another study, hypotensive episodes occurred frequently in 44% of dialysis patients of ≥65 years and in 32% of younger dialysis patients (age <45 years) [2]. One study also found lower albumin levels in patients with hypotension during haemodialysis [3].

Cardiac abnormalities may increase the risk for IDH. In an observational study in 15 dialysis patients, the decline in BP was larger in patients with systolic dysfunction, compared with patients with normal systolic function [4]. Also, diastolic dysfunction may increase the risk for IDH. In an observational study with 47 haemodialysis patients, those with frequent IDH episodes had more severe concentric left ventricular hypertrophy, lower pre-dialysis BP and impaired diastolic left ventricular filling [5]. Although it is often considered that anaemia is a risk factor for IDH, especially in patients with cardiac disease, there has been no study addressing this relationship.

Also, the existence of autonomous neuropathy was found to be a risk factor for IDH in most [6–11], but not all studies [12,13].

The sensitivity of patients for IDH may not be a stable condition. Seven patients who frequently experienced IDH episodes were found to have large differences in the incidence of IDH over a 24-month period [14]. Moreover, there are seasonal variations in BP behaviour among chronic HD patients [15].

如收缩期或舒张期功能障碍、向心性左心室肥大

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对左卡尼汀的推荐

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3.6 Dialysis duration and frequency.

3.7 Switch to peritoneal dialysis.

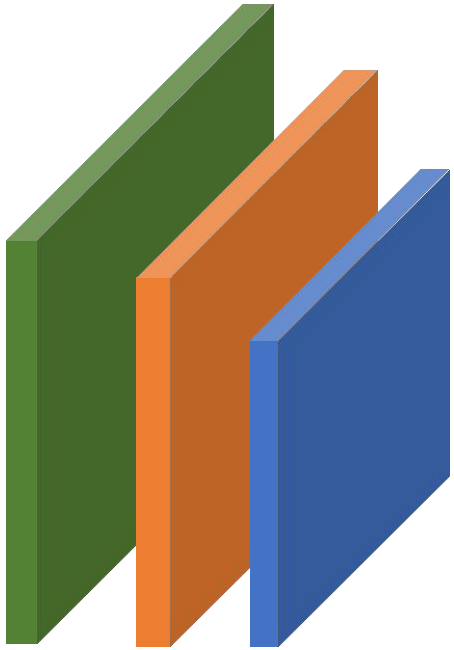
4. Antihypertensive drugs and preventive medication

4.1 Antihypertensive drugs
4.2 Preventive vasoactive agents
4.3 Carnitine

5. Stratified approach to prevent IDH

4、抗高血压药物和预防药物
4.1 抗高血压药物
4.2 预防性血管活性药物
4.3 卡尼汀

指南4：避免在透析前使用抗高血压药物和血管活性药物治疗



- **指南4.1**
  对于IDH频繁发作的患者，在透析前应谨慎使用降压药，但不应在血液透析治疗当天停用（证据III级）
- **指南4.2**
  如果其他治疗方案失败，应考虑米多君(证据I级)。
- **指南4.3**
  如果其他治疗方案失败，应考虑补充**左卡尼汀**预防IDH(证据III级)。

4. Avoidance of antihypertensive drugs and prescription of vasoactive medication before dialysis

- **Guideline 4.1 In patients with frequent episodes of IDH, antihypertensive agents should be given with caution prior to dialysis depending on pharmacodynamics, but should not be routinely withheld on the day of haemodialysis treatment (Evidence level III).**
- **Guideline 4.2 Midodrine should be considered if other treatment options have failed (Evidence level I).**
- **Guideline 4.3 L-carnitine supplementation should be considered for the prevention of IDH if other treatment options have failed (Evidence level III).**

指南4.3 如果其他治疗方案失败，应考虑补充左卡尼汀预防IDH(证据III级)。

- ✓ **缺乏原因**：血液透析患者的肾脏的生物合成减少、随着透析液的流失
- ✓ **补充获益**：1)左卡尼汀缺乏可导致心脏收缩功能下降，补充可改善左心室射血分数；
  2)低卡尼汀水平与IDH相关，补充可改善IDH
- ✓ **补充方法**：每次透析结束时20 mg/kg

- **Guideline 4.3 L-carnitine supplementation should be considered for the prevention of IDH if other treatment options have failed (Evidence level III).**

In haemodialysis patients, L-carnitine levels may be low because of reduced biosynthesis in the kidney and losses in the dialysate. L-carnitine deficiency may lead to reduced systolic function of the heart. In an uncontrolled study, L-carnitine supplementation resulted in an improvement in left ventricular ejection fraction [1]. In another study, a relation between low carnitine levels and IDH was observed [2]. One randomized study showed an improvement in IDH after L-carnitine supplementation [3]. However, in this study, haemodynamic stability was one of many endpoints. Moreover, no further studies have assessed the effects of L-carnitine supplementation on IDH.

It is not known whether the potential beneficial effects of L-carnitine supplementations on IDH are restricted to patients with reduced left ventricular

指南5：分层方法预防IDH

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5. Stratified approach to prevent IDH

First-line approach

- Dietary counselling (sodium restriction).
- Refraining from food intake during dialysis.
- Clinical reassessment of dry weight.
- Use of bicarbonate as dialysis buffer.
- Use of a dialysate temperature of 36.5°C.
- Check dosing and timing of antihypertensive agents.

Second-line approach

- Try objective methods to assess dry weight.
- Perform cardiac evaluation.
- Gradual reduction of dialysate temperature from 36.5°C downward (lowest 35°C) or isothermic treatment (possible alternative: convective treatments).
- Consider individualized blood volume controlled feedback.
- Prolong dialysis time and/or increase dialysis frequency.
- Prescribe a dialysate calcium concentration of 1.50 mmol/l.

Third-line approach (only if other treatment options have failed)

- Consider midodrine.
- Consider L-carnitine supplementation.
- Consider peritoneal dialysis.

一线方法	• 膳食咨询（限钠）； • 透析期间避免进食； • 临床净重评估； • 使用碳酸氢盐作为透析缓冲液； • 使用的透析液温度为36.58℃； • 检查抗高血压药物的剂量和时间。
二线方法	客观的方法来评估净重； 进行心脏评估； 透析液温度由36.5℃逐渐下降(最低35℃)或等温处理(可能的替代方法:对流处理)； 考虑个体化血容量控制反馈； 延长透析时间和/或增加透析频率； 规定透析液钙离子浓度为1.50mmol/l；
三线方法 （其它治疗方案失败的情况下）	考虑米多君 **考虑左卡尼汀补充剂** 考虑腹膜透析

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谢谢关注！

thanks for your attention.

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