脓毒症和脓毒性休克的管理
---2016国际指南更新要点

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拯救脓毒症运动
Surviving Sepsis Campaign

- 2002年，巴塞罗那宣言：向脓毒症宣战
- 2004年、2008年、2012年SSC国际指南
- 2015年6月中华医学会重症医学分会发布《中国严重脓毒症/脓毒性休克治疗指南（2014）》
- 2017年1月发布第四版SSC国际指南

中华内科杂志 2015 年 6 月第 54 卷第 6 期　C hin J Intern Me d, June 2015, Vol. 54, No.6

·标准与讨论·

中国严重脓毒症/脓毒性休克治疗指南(2014)

中华医学会重症医学分会

中华内科杂志.2015,54(6):557-81.

《中国严重脓毒症/脓毒性休克治疗指南》

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中华内科杂志.2015,54(6):557-81.

SSC：脓毒症和脓毒性休克管理国际指南：2016

Surviving Sepsis Campaign: International Guidelines for Management of Sepsis and Septic Shock: 2016

Rhodes A et al. Crit Care Med. 2017 Jan 17.

2016国际脓毒症和脓毒性休克管理指南

- The following sponsoring organizations (with formal liaison appointees) endorse this guideline: American College of Chest Physicians, American College of Emergency Physicians, American Thoracic Society, Asia Pacific Association of Critical Care Medicine, Associação de Medicina Intensiva Brasileira, Australian and New Zealand Intensive Care Society, Consorcio Centroamericano y del Caribe de Terapia Intensiva, European Society of Clinical Microbiology and Infectious Diseases, German Sepsis Society,Indian Society of Critical Care Medicine, International Pan Arab Critical Care Medicine Society, Japanese Association for Acute Medicine, Japanese Society of Intensive Care Medicine, Latin American Sepsis Institute, Scandinavian Critical Care Trials Group, Society for Academic Emergency Medicine, Society of Hospital Medicine, Surgical Infection Society, World Federation of Critical Care Nurses, World Federation of Societies of Intensive and Critical Care Medicine.

Rhodes A et al. Crit Care Med. 2017 Jan 17.

2016国际脓毒症和脓毒性休克管理指南

- The following non-sponsoring organizations (without formal liaison appointees) endorse this guideline: Academy of Medical Royal Colleges, Chinese Society of Critical Care Medicine, Asociación Colombiana de Medicina Crítica y Cuidado Intensivo, Emirates Intensive Care Society, European Society of Paediatric and Neonatal Intensive Care, European Society for Emergency Medicine, Federación Panamericana e Ibérica de Medicina Crítica y Terapia Intensiva, Sociedad Peruana de Medicina Intensiva, Shock Society, Sociedad Argentina de Terapia Intensiva, World Federation of Pediatric Intensive and Critical Care Societies.

Rhodes A et al. Crit Care Med. 2017 Jan 17.

2016国际脓毒症和脓毒性休克管理指南

- 结果：拯救脓毒症指南专家组提出了93条关于脓毒症和脓毒性休克早期管理及复苏的推荐意见。强烈推荐32条，推荐级别较弱39条，最佳实践陈述（best-practice statements，BPS）18条。有四个问题没有提供推荐意见。

Rhodes A et al. Crit Care Med. 2017 Jan 17.

2016国际脓毒症和脓毒性休克管理指南

- A.早期复苏（7条）
- B.脓毒症筛查与诊疗优化（1条）
- C.诊断（1条）
- D.抗菌药物治疗（15条）
- E.感染源控制（2条）
- F.液体治疗（6条）
- G.血管活性药物（6条）

Rhodes A et al. Crit Care Med. 2017 Jan 17.

2016国际脓毒症和脓毒性休克管理指南

- H.糖皮质激素（1条）
- I.血液制品（4条）
- J.免疫球蛋白（1条）
- K.血液净化（1条）
- L.抗凝剂（2条）
- M.机械通气（15条）
- N.镇静与镇痛（1条）

Rhodes A et al. Crit Care Med. 2017 Jan 17.

2016国际脓毒症和脓毒性休克管理指南

- O.血糖控制（4条）
- P.肾脏替代治疗（3条）
- Q.碳酸氢盐治疗（1条）
- R.静脉血栓的预防（4条）
- S.应激性溃疡的预防（3条）
- T.营养（12条）
- U.设置治疗目标（3条）

Rhodes A et al. Crit Care Med. 2017 Jan 17.

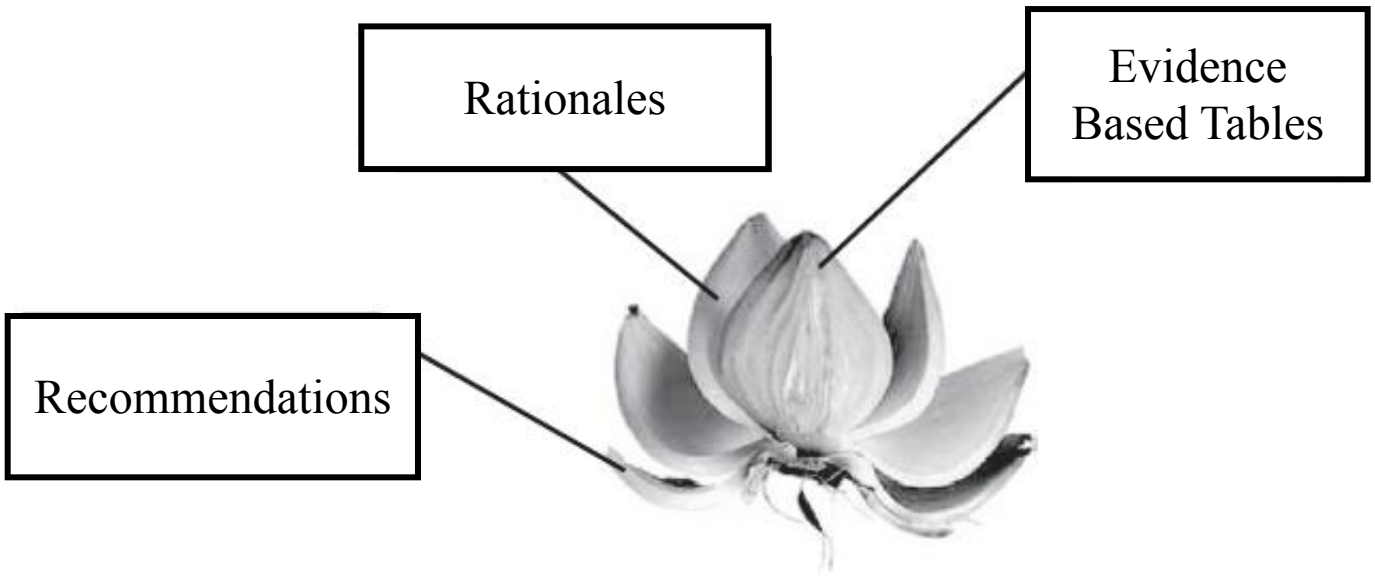
2016国际脓毒症和脓毒性休克管理指南

- 结论：众多国际专家就脓毒症患者的最佳管理形成了较多强烈推荐意见。虽然有相当数量的推荐意见证据级别较弱，但以证据为基础的推荐意见用于脓毒症及脓毒性休克的早期管理是这些高死亡风险危重患者改善预后的基础。

Rhodes A et al. Crit Care Med. 2017 Jan 17.

A Users' Guide to the 2016 Surviving Sepsis Guidelines

Layers of the SSC Guidelines



Photograph of onion from Je Suis Charlie Who? by Wade Fransn and courtesy of Something or Other Publising. January 12,2015.

The layers of an onion are paralleled to the components of the guidelines document,reflecting the depth of exploration by the user.

Dellinger RP et al. Intensive Care Med. 2017 Jan 18.

Opinion

VIEWPOINT

Surviving Sepsis Guidelines
A Continuous Move Toward Better Care of Patients With Sepsis

- There are numerous major advances in the revision of the guidelines. Among the various topics covered, initial resuscitation and antibiotic therapy are the domains in which the most important changes and advances were made.

De Backer D et al. JAMA. 2017 Jan 19.

原创 2017-01-20 火凤凰翻译组 急诊医学资讯

Surviving Sepsis Campaign: International Guidelines for Management of Sepsis and Septic Shock: 2016.

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拯救脓毒症运动2017年1月17日在critical care medicine杂志在线发布2016版脓毒症以及脓毒症休克国际处理指南。急诊医学资讯火凤凰翻译组组成翻译小组对指南推荐意见进行翻译，并结合急诊医学资讯既往发布的文章简要介绍原理解读。现将指南分享如下：

急诊医学资讯

A. INITIAL RESUSCITATION
A.初始复苏

Rhodes A et al. Crit Care Med. 2017 Jan 17.

A.初始复苏

- 1.Sepsis and septic shock are medical emergencies, and we recommend that treatment and resuscitation begin immediately (BPS).
- 1.脓毒症和脓毒性休克均为医疗急症，推荐立即进行治疗和复苏（BPS）。

Rhodes A et al. Crit Care Med. 2017 Jan 17.

A.初始复苏

- 2.We recommend that, in the resuscitation from sepsis induced hypoperfusion, at least 30mL/kg of IV crystalloid fluid be given within the first 3 hours (strong recommendation, low quality of evidence).
- 2.推荐对脓毒症引起的低灌注患者进行复苏，在最初3小时内至少静脉输注30ml/kg的晶体液（强烈推荐，低证据质量）。

Rhodes A et al. Crit Care Med. 2017 Jan 17.

EGDT?

- Previous iterations of these guidelines have recommended a protocolized quantitative resuscitation, otherwise known as early goal-directed therapy (EGDT), which was based on the protocol published by Rivers . This approach has now been challenged following the failure to show a mortality reduction in three subsequent large multicenter RCTs . No harm was associated with the interventional strategies; thus, the use of the previous targets is still safe and may be considered.

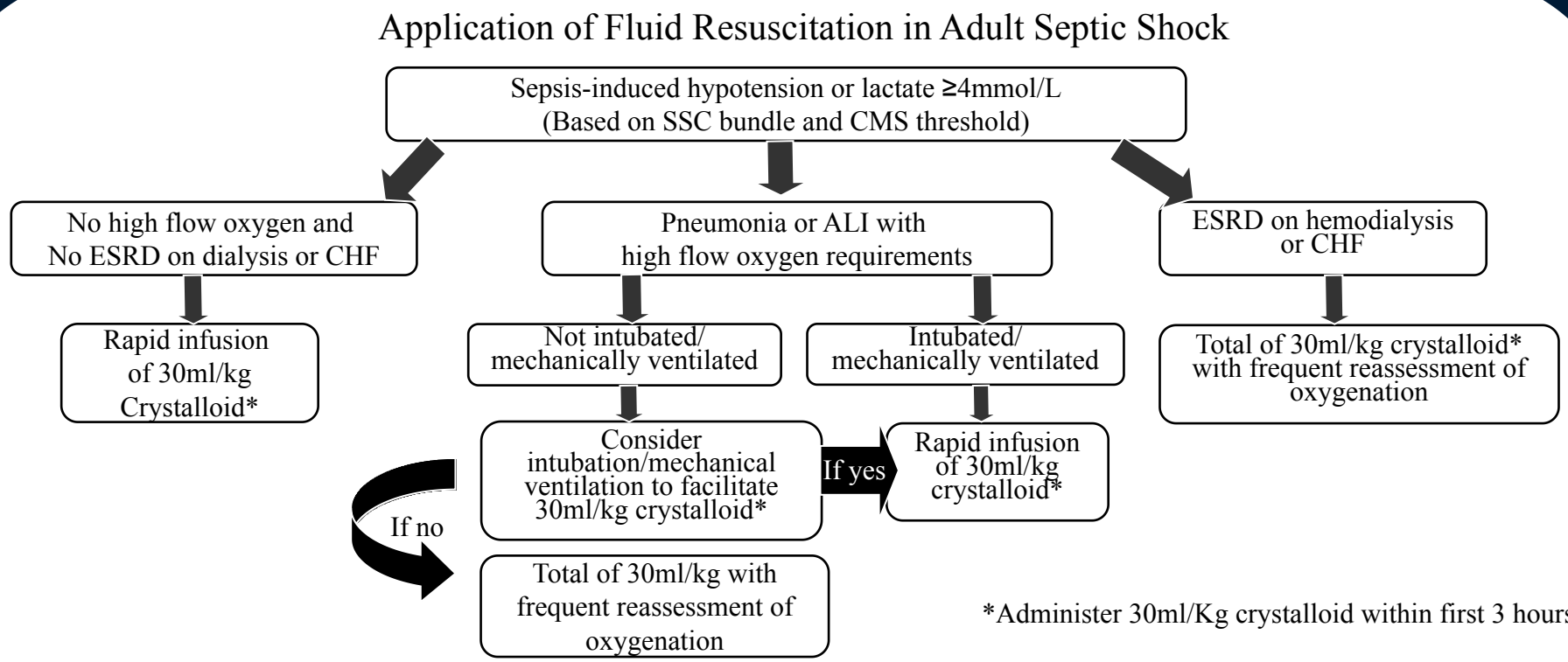
Rhodes A et al. Crit Care Med. 2017 Jan 17.

EGDT?

- For initial resuscitation, previous guidelines were mostly based on early goal-directed therapy, which has been challenged by recent trials, and this approach is no longer recommended. Of note, no harm was demonstrated in those trials, so there was not a recommendation to avoid early goal-directed therapy targets.

De Backer D et al. JAMA. 2017 Jan 19.

强调3小时内至少输注30ml/kg晶体液



Considerations post 30ml/kg crystalloid infusion

1.Continue to balance fluid resuscitation and vasopressor dose with attention to maintain tissue perfusion and minimize interstitial edema

2.Implement some combination of the list below to aid in further resuscitation choices that may include additional fluid or inotrope therapy

- blood pressure/heart rate response,
- urine output,
- cardiothoracic ultrasound,
- CVP,$ScvO_2$,
- pulse pressure variation
- lactate clearance/normalization or
- dynamic measurement such as response of flow to fluid bolus or passive leg raising

3.Consider albumin fluid resuscitation,when large volumes of crystalloid are required to maintain intravascular volume.

Dellinger RP et al. Intensive Care Med. 2017 Jan 18.

A.初始复苏

- 3.We recommend that, following initial fluid resuscitation, additional fluids be guided by frequent reassessment of hemodynamic status (BPS).
- 3.推荐早期液体复苏后，需反复评估血流动力学指标以指导后续液体复苏（BPS）。

Rhodes A et al. Crit Care Med. 2017 Jan 17.

A.初始复苏

- Remarks: Reassessment should include a thorough clinical examination and evaluation of available physiologic variables (heart rate, blood pressure, arterial oxygen saturation, respiratory rate, temperature, urine output, and others, as available) as well as other noninvasive or invasive monitoring, as available.
- 备注：反复评估包括全面的临床检查、可获取的生理指标（心率、血压、动脉血氧饱和度、呼吸频率、体温、尿量等）以及其他可获取的无创或有创的监测指标。

Rhodes A et al. Crit Care Med. 2017 Jan 17.

A.初始复苏

- 4.We recommend further hemodynamic assessment (such as assessing cardiac function) to determine the type of shock if the clinical examination does not lead to a clear diagnosis (BPS).
- 4.推荐对临床检查不能明确诊断的患者，进一步采用血流动力学监测（如心功能评估）来判断休克类型（BPS）。

Rhodes A et al. Crit Care Med. 2017 Jan 17.

A.初始复苏

- 5.We suggest that dynamic over static variables be used to predict fluid responsiveness, where available (weak recommendation, low quality of evidence).
- 5.建议在情况允许时，相较于静态指标，尽可能应用动态指标预测容量反应性（弱推荐，低证据质量）。

Rhodes A et al. Crit Care Med. 2017 Jan 17.

A.初始复苏

- 6.We recommend an initial target mean arterial pressure (MAP) of 65 mmHg in patients with septic shock requiring vasopressors (strong recommendation, moderate quality of evidence).
- 6.推荐对于需要应用血管活性药物治疗的脓毒性休克患者，平均动脉压的初始目标为65mmHg（强推荐，中等证据质量）。

Rhodes A et al. Crit Care Med. 2017 Jan 17.

A.初始复苏

- 7.We suggest guiding resuscitation to normalize lactate in patients with elevated lactate levels as a marker of tissue hypoperfusion (weak recommendation, low quality of evidence).
- 7.建议对于以乳酸水平升高作为低灌注指标的患者，以乳酸水平降至正常作为复苏目标（弱推荐，低证据质量）。

Rhodes A et al. Crit Care Med. 2017 Jan 17.

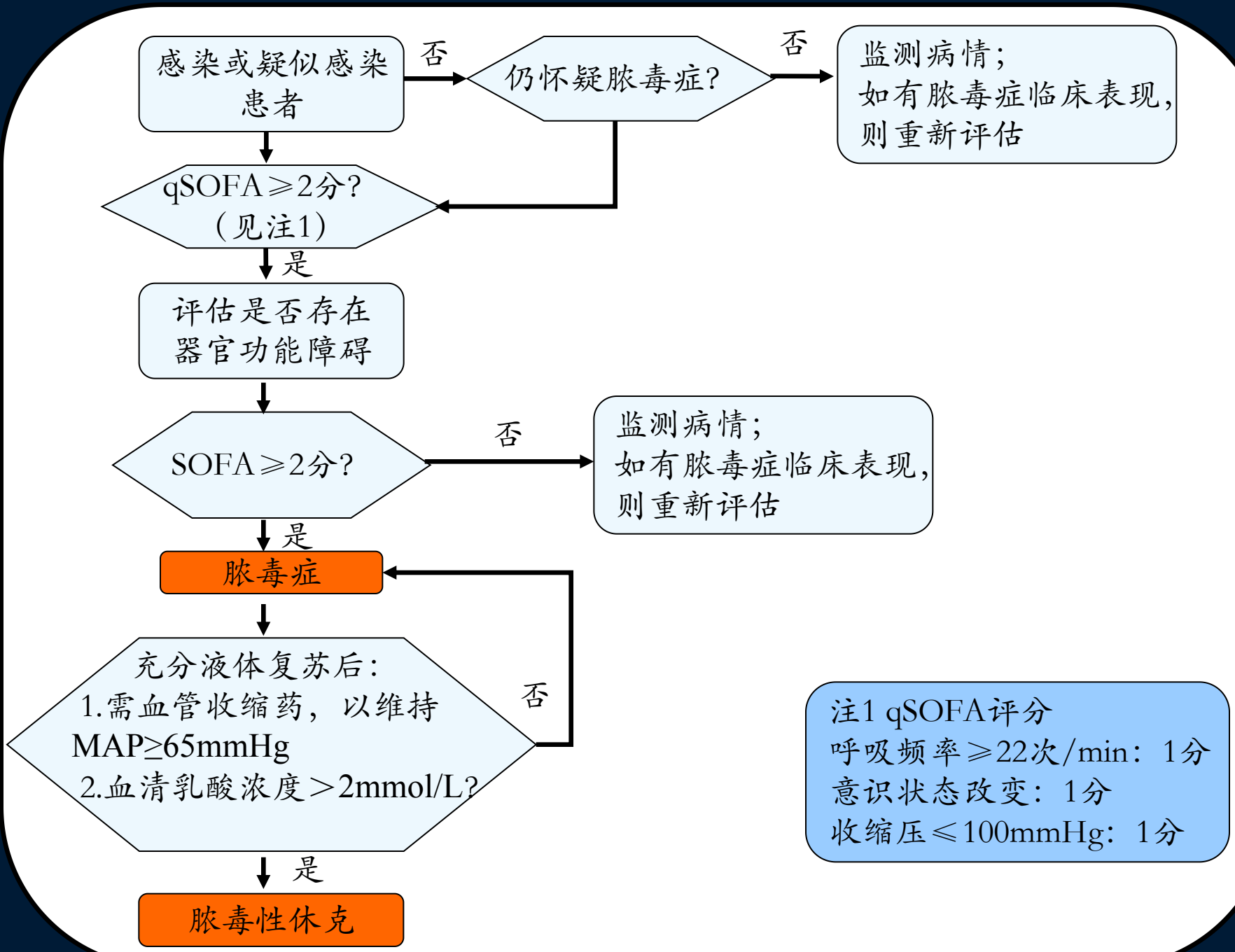
B.SCREENING FOR SEPSIS AND PERFORMANCE IMPROVEMENT
B.脓毒症筛查与诊疗优化

Rhodes A et al. Crit Care Med. 2017 Jan 17.

B.脓毒症筛查与诊疗优化

- 1.We recommend that hospitals and hospital systems have a performance improvement program for sepsis, including sepsis screening for acutely ill, high-risk patients (BPS).
- 1.推荐医院及医疗系统优化脓毒症诊疗措施，包括对急症、高危患者进行脓毒症筛查（BPS）。

Rhodes A et al. Crit Care Med. 2017 Jan 17.


感染或疑似感染患者
否
仍怀疑脓毒症?
否
监测病情;
如有脓毒症临床表现,
则重新评估
qSOFA≥2分?
(见注1)
是
评估是否存在
器官功能障碍
SOFA≥2分?
否
监测病情;
如有脓毒症临床表现,
则重新评估
是
脓毒症
充分液体复苏后:
1.需血管收缩药,以维持
MAP≥65mmHg
2.血清乳酸浓度>2mmol/L?
否
是
脓毒性休克
注1 qSOFA评分
呼吸频率≥22次/min:1分
意识状态改变:1分
收缩压≤100mmHg:1分

C.DIAGNOSIS
C.诊断

Rhodes A et al. Crit Care Med. 2017 Jan 17.

C.诊断

- 1.We recommend that appropriate routine microbiologic cultures (including blood) be obtained before starting antimicrobial therapy in patients with suspected sepsis or septic shock if doing so results in no substantial delay in the start of antimicrobials (BPS).
- 1.推荐对怀疑脓毒症或脓毒性休克的患者，在不延误抗微生物治疗的情况下，用药前获取恰当的微生物标本（包括血培养）（BPS）。

Rhodes A et al. Crit Care Med. 2017 Jan 17.

C.诊断

- Remarks: Appropriate routine microbiologic cultures always include at least two sets of blood cultures (aerobic and anaerobic).
- 备注：恰当的常规病原微生物培养至少包括至少2套血培养（需氧培养及厌氧）标本。

Rhodes A et al. Crit Care Med. 2017 Jan 17.

D. ANTIMICROBIAL THERAPY
D.抗菌药物治疗

D.抗菌药物治疗

- 1. We recommend that administration of IV antimicrobials be initiated as soon as possible after recognition and within one hour for both sepsis and septic shock (strong recommendation, moderate quality of evidence; grade applies to both conditions).
- 1.推荐在识别脓毒症及脓毒性休克1小时内尽快静脉应用抗菌药物（强推荐，中等证据质量）。

Rhodes A et al. Crit Care Med. 2017 Jan 17.

D.抗菌药物治疗

- 研究显示对于脓毒症或脓毒性休克，抗菌药物给药每延迟一小时都会增加病死率、延长住院时间，增加急性肾损伤、急性肺损伤等风险。

Rhodes A et al. Crit Care Med. 2017 Jan 17.

D.抗菌药物治疗

- 2. We recommend empiric broad-spectrum therapy with one or more antimicrobials for patients presenting with sepsis or septic shock to cover all likely pathogens (including bacterial and potentially fungal or viral coverage) (strong recommendation, moderate quality of evidence).
- 2.推荐对脓毒症或脓毒性休克患者经验性使用一种或几种抗菌药物广谱治疗，以覆盖所有可能的病原体（包括细菌和可能的真菌或病毒）（强推荐，中等证据质量）。

Rhodes A et al. Crit Care Med. 2017 Jan 17.

D.抗菌药物治疗

- 3. We recommend that empiric antimicrobial therapy be narrowed once pathogen identification and sensitivities are established and/or adequate clinical improvement is noted (BPS).
- 3.推荐一旦明确病原体及药敏结果和/或临床充分改善，将经验性抗菌治疗转变为窄谱治疗（BPS）。

Rhodes A et al. Crit Care Med. 2017 Jan 17.

D.抗菌药物治疗

- 4. We recommend against sustained systemic antimicrobial prophylaxis in patients with severe inflammatory states of noninfectious origin (e.g., severe pancreatitis, burn injury) (BPS).
- 4. 推荐对于非感染原因所致的严重炎症状态（例如，重症胰腺炎、烧伤）患者不持续全身预防性使用抗菌药物（BPS）。

Rhodes A et al. Crit Care Med. 2017 Jan 17.

D.抗菌药物治疗

- 5. We recommend that dosing strategies of antimicrobials be optimized based on accepted pharmacokinetic/pharmacodynamic principles and specific drug properties in patients with sepsis or septic shock (BPS).
- 5. 推荐对于脓毒症或脓毒性休克患者基于公认的药代动力学/药效动力学原理以及药物特性优化抗菌药物剂量策略（BPS）。

Rhodes A et al. Crit Care Med. 2017 Jan 17.

D.抗菌药物治疗

- 6. We suggest empiric combination therapy (using at least two antibiotics of different antimicrobial classes) aimed at the most likely bacterial pathogen(s) for the initial management of septic shock (weak recommendation, low quality of evidence).
- 6. 建议对脓毒性休克患者早期针对最可能的细菌病原体经验性联合用药（至少使用两种不同种类的抗菌药物）（弱推荐，低证据质量）。

Rhodes A et al. Crit Care Med. 2017 Jan 17.

D.抗菌药物治疗

- 7. We suggest that combination therapy not be routinely used for ongoing treatment of most other serious infections, including bacteremia and sepsis without shock (weak recommendation, low quality of evidence).
- 7.建议对于大多数其他类型的严重感染，包括菌血症和不合并休克的脓毒症，不常规联合治疗（弱推荐，低证据质量）。

Rhodes A et al. Crit Care Med. 2017 Jan 17.

D.抗菌药物治疗

- 8. We recommend against combination therapy for the routine treatment of neutropenic sepsis/bacteremia (strong recommendation, moderate quality of evidence).
- 8.不推荐中性粒细胞减少的脓毒症/菌血症常规联合治疗（强烈推荐，中等质量证据）

Rhodes A et al. Crit Care Med. 2017 Jan 17.

D.抗菌药物治疗

- 9. If combination therapy is initially used for septic shock, we recommend de-escalation with discontinuation of combination therapy within the first few days in response to clinical improvement and/or evidence of infection resolution. This applies to both targeted (for culture-positive infections) and empiric (for culture-negative infections) combination therapy (BPS).
- 9.如果脓毒性休克早期采用联合治疗，推荐在临床改善和/或感染好转时，尽早降阶梯并停止联合治疗。这对于靶向（对于培养阳性）和经验（培养阴性）联合治疗均适用（BPS）。

Rhodes A et al. Crit Care Med. 2017 Jan 17.

D.抗菌药物治疗

- 10. We suggest that an antimicrobial treatment duration of 7 to 10 days is adequate for most serious infections associated with sepsis and septic shock (weak recommendation, low quality of evidence).
- 10.建议大多数脓毒症或脓毒性休克相关严重感染的抗菌治疗疗程为7-10天。（弱推荐，低证据质量）。

Rhodes A et al. Crit Care Med. 2017 Jan 17.

D.抗菌药物治疗

- 11. We suggest that longer courses are appropriate in patients who have a slow clinical response, undrainable foci of infection, bacteremia with S aureus, some fungal and viral infections, or immunologic deficiencies, including neutropenia. (weak recommendation, low quality of evidence).
- 11. 建议对临床反应慢、感染灶无法充分引流、金黄色葡萄球菌菌血症、某些真菌和病毒感染或包括粒细胞减少在内的免疫缺陷患者延长疗程（弱推荐，低证据质量）。

Rhodes A et al. Crit Care Med. 2017 Jan 17.

D.抗菌药物治疗

- 12. We suggest that shorter courses are appropriate in some patients, particularly those with rapid clinical resolution following effective source control of intra-abdominal or urinary sepsis and those with anatomically uncomplicated pyelonephritis (weak recommendation, low quality of evidence).
- 12. 建议对于某些患者缩短疗程，尤其是有效清除感染灶后临床迅速改善的腹腔、尿路感染脓毒症和非复杂性肾盂肾炎患者（弱推荐，低证据质量）。

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D.抗菌药物治疗

- 13. We recommend daily assessment for de-escalation of antimicrobial therapy in patients with sepsis and septic shock (BPS).
- 13. 推荐对脓毒症或脓毒性休克患者，每日评估抗菌药物治疗是否可以降阶梯。

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D.抗菌药物治疗

- 14. We suggest that measurement of procalcitonin levels can be used to support shortening the duration of antimicrobial therapy in sepsis patients (weak recommendation, low quality of evidence).
- 14.建议测定降钙素原水平，以缩短脓毒症患者抗菌药物疗程（弱推荐，低证据质量）。

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D.抗菌药物治疗

- 15. We suggest that procalcitonin levels can be used to support the discontinuation of empiric antibiotics in patients who initially appeared to have sepsis, but subsequently have limited clinical evidence of infection (weak recommendation, low quality of evidence).
- 15. 建议对于初始疑似脓毒症而感染临床证据不足患者监测降钙素原水平，以辅助停止经验性抗菌治疗（弱推荐，低证据质量）。

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E. SOURCE CONTROL
E.感染源控制

E.感染源控制

- 1. We recommend that a specific anatomic diagnosis of infection requiring emergent source control be identified or excluded as rapidly as possible in patients with sepsis or septic shock, and that any required source control intervention be implemented as soon as medically and logistically practical after the diagnosis is made (BPS).
- 1. 推荐对于脓毒症或脓毒性休克患者，要尽快明确或排除需要紧急控制的具体解剖部位的感染源，并且在做出诊断之后要尽早采取任何有助于控制感染源的药物或操作来干预。（BPS）

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E.感染源控制

- 2. We recommend prompt removal of intravascular access devices that are a possible source of sepsis or septic shock after other vascular access has been established (BPS).
- 2. 推荐在新的血管通路建立起来之后，要尽快拔除可疑引起脓毒症或脓毒性休克的血管内植入物。（BPS）

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F. FLUID THERAPY
F.液体治疗

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F.液体治疗

- 1.We recommend that a fluid challenge technique be applied where fluid administration is continued as long as hemodynamic factors continue to improve (BPS).
- 1.我们推荐在持续输液改善血流动力学过程中进行补液试验（BPS）。

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F.液体治疗

- 2.We recommend crystalloids as the fluid of choice for initial resuscitation and subsequent intravascular volume replacement in patients with sepsis and septic shock (strong recommendation, moderate quality of evidence).
- 2.我们推荐在脓毒症或脓毒性休克患者的初始液体复苏和进一步容量补充中使用晶体液（强推荐，中等质量证据）。

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F.液体治疗

- 3.We suggest using either balanced crystalloids or saline for fluid resuscitation of patients with sepsis or septic shock (weak recommendation, low quality of evidence).
- 3.我们推荐使用平衡晶体液或生理盐水用于脓毒症或脓毒性休克患者的液体复苏（弱推荐，低质量证据）。

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F.液体治疗

- 4.We suggest using albumin in addition to crystalloids for initial resuscitation and subsequent intravascular volume replacement in patients with sepsis and septic shock when patients require substantial amounts of crystalloids (weak recommendation, low quality of evidence).
- 4.对于脓毒症或脓毒性休克患者的初始液体复苏和后续的容量补充，当需要输注大量晶体液时，推荐晶体液联合白蛋白（弱推荐，低质量证据）。

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F.液体治疗

- 5.We recommend against using hydroxyethyl starches (HESs) for intravascular volume replacement in patients with sepsis or septic shock (strong recommendation, high quality of evidence).
- 5.我们不推荐使用羟乙基淀粉用于脓毒症或脓毒性休克患者的扩容治疗（强推荐，高质量证据）。

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F.液体治疗

- 6.We suggest using crystalloids over gelatins when resuscitating patients with sepsis or septic shock (weak recommendation, low quality of evidence).
- 6.建议在脓毒症或脓毒性休克患者复苏阶段，使用晶体液而非明胶（弱推荐，低质量证据）。

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G.VASOACTIVE MEDICATIONS
G.血管活性药物

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G.血管活性药物

- 1.We recommend norepinephrine as the first-choice vasopressor (strong recommendation, moderate quality of evidence).
- 1.推荐去甲肾上腺素作为首选升压药物（强推荐，中等质量证据）。

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G.血管活性药物

- 2.We suggest adding either vasopressin (up to 0.03 U/min) (weak recommendation, moderate quality of evidence) or epinephrine (weak recommendation, low quality of evidence) to norepinephrine with the intent of raising MAP to target, or adding vasopressin (up to 0.03 U/min) (weak recommendation, moderate quality of evidence) to decrease norepinephrine dosage.
- 2.推荐血管加压素（最大剂量0.03U/min）（弱推荐，中等质量证据）或肾上腺素（弱推荐，低质量证据）联合去甲肾上腺素提升平均动脉压至目标值，或加用血管加压素（最大剂量0.03U/min）（弱推荐，中等质量证据）以减少去甲肾上腺素的剂量。

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G.血管活性药物

- 3.We suggest using dopamine as an alternative vasopressor agent to norepinephrine only in highly selected patients (e.g., patients with low risk of tachyarrhythmias and absolute or relative bradycardia) (weak recommendation, low quality of evidence).
- 3.推荐在特定患者（如心动过速风险低且伴有绝对或相对心动过缓的患者）中使用多巴胺作为除去甲肾上腺素以外的辅助升压药（弱推荐，低质量证据）。

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G.血管活性药物

- 4.We recommend against using low-dose dopamine for renal protection (strong recommendation, high quality of evidence).
- 4. 不推荐使用小剂量多巴胺作为肾保护药物（强推荐，高质量证据）。

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G.血管活性药物

- 5.We suggest using dobutamine in patients who show evidence of persistent hypoperfusion despite adequate fluid loading and the use of vasopressor agents (weak recommendation, low quality of evidence).
- 5.推荐在给予足量液体负荷且使用升压药物后仍然存在持续性低灌注的患者中使用多巴酚丁胺（弱推荐，低质量证据）。

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G.血管活性药物

- 最近的一项纳入11个随机试验（n=1710）的系统性回顾以及meta分析，对比了去甲肾上腺素和多巴胺，其结果不支持在感染性休克的治疗中常规应用多巴胺。的确，与多巴胺相比，去甲肾上腺素的应用导致了病死率的下降（RR 0.89; 95% CI 0.81-0.98,高质量证据）以及心律失常风险的降低（RR 0.48; 95% CI 0.40-0.58; 高质量证据）。

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G.血管活性药物

- 人类以及动物研究提示，输注肾上腺素可能对于内脏循环有害，而且引起高乳酸血症。然而，临床试验并没有证实临床预后的恶化。一项对比去甲肾上腺素以及肾上腺素的RCT证实，病死率没有差异，但肾上腺素相关的药物不良反应事件有增加。类似的，一项关于4个随机试验的meta分析（n=540）对比了去甲肾上腺素与肾上腺素，发现病死率没有明显差异（RR 0.96; CI0.77-1.21; 低质量证据）。肾上腺素可能通过刺激骨骼肌的β_2肾上腺素受体而增加乳酸的有氧生成，因此可能妨碍了应用乳酸清除率指导复苏。

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G.血管活性药物

- 6.We suggest that all patients requiring vasopressors have an arterial catheter placed as soon as practical if resources are available (weak recommendation, very low quality of evidence).
- 6.推荐有条件时，对于所有使用升压药者均尽快置入动脉导管进行监测（弱推荐，极低质量证据）。

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H.CORTICOSTEROIDS
H.糖皮质激素

H.糖皮质激素

- 1. We suggest against using IV hydrocortisone to treat septic shock patients if adequate fluid resuscitation and vasopressor therapy are able to restore hemodynamic stability. If this is not achievable, we suggest IV hydrocortisone at a dose of 200 mg per day (weak recommendation, low quality of evidence).
- 1.如果充分的液体复苏和升压药治疗能够维持血流动力学稳定，不建议静脉注射氢化可的松治疗脓毒性休克患者。如果血流动力学仍不稳定，建议静脉使用氢化可的松200mg/d（弱推荐，低质量证据）。

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I.BLOOD PRODUCTS
I.血液制品

I.血液制品

- 1. We recommend that RBC transfusion occur only when hemoglobin concentration decreases to < 7.0 g/dL in adults in the absence of extenuating circumstances, such as myocardial ischemia, severe hypoxemia, or acute hemorrhage (strong recommendation, high quality of evidence).
- 1、推荐在不存在以下情况：如心肌缺血、严重低氧血症或急性出血的成年患者，只有血红蛋白浓度降低至<7.0g/dl时才输注RBC（强推荐，高质量证据）。

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I.血液制品

- 2. We recommend against the use of erythropoietin for treatment of anemia associated with sepsis (strong recommendation, moderate quality of evidence).
- 2.不推荐使用促红细胞生成素用于治疗脓毒症相关的贫血（强推荐，中等质量证据）。

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I.血液制品

- 3. We suggest against the use of fresh frozen plasma to correct clotting abnormalities in the absence of bleeding or planned invasive procedures (weak recommendation, very low quality of evidence).
- 3. 不建议在没有出血或计划进行侵入性操作时使用新鲜冰冻血浆来纠正凝血异常（弱推荐，极低质量证据）。

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I.血液制品

- 4. We suggest prophylactic platelet transfusion when counts are < 10,000/mm^3 (10×10^9/L) in the absence of apparent bleeding and when counts are < 20,000/mm^3 (20×10^9/L) if the patient has a significant risk of bleeding. Higher platelet counts (≥ 50,000/mm^3 [50×10^9/L]) are advised for active bleeding, surgery, or invasive procedures (weak recommendation, very low quality of evidence).
- 4．建议无明显出血时血小板计数小于10,000/mm^3（10×10^9/L），有明显出血风险时血小板计数小于20,000/mm^3（20×10^9/L）时预防性输注血小板。伴活动性出血风险、拟进行外科手术或侵入性操作的患者需要达到更高的血小板水平（≥ 50,000/mm^3 [50×10^9/L]）（弱推荐，极低质量证据）。

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J. IMMUNOGLOBULINS
J.免疫球蛋白

J.免疫球蛋白

- 1. We suggest against the use of IV immunoglobulins in patients with sepsis or septic shock (weak recommendation, low quality of evidence).
- 1. 不建议对严重脓毒症或脓毒性休克患者静脉使用免疫球蛋白（弱推荐，低质量证据）。

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2016国际脓毒症和脓毒性休克管理指南

- A.早期复苏（7条）
- B.脓毒症筛查与诊疗优化（1条）
- C.诊断（1条）
- D.抗菌药物治疗（15条）
- E.感染源控制（2条）
- F.液体治疗（6条）
- G.血管活性药物（6条）

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2016国际脓毒症和脓毒性休克管理指南

- H.糖皮质激素（1条）
- I.血液制品（4条）
- J.免疫球蛋白（1条）
- K.血液净化（1条）
- L.抗凝剂（2条）
- M.机械通气（15条）
- N.镇静与镇痛（1条）

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2016国际脓毒症和脓毒性休克管理指南

- O.血糖控制（4条）
- P.肾脏替代治疗（3条）
- Q.碳酸氢盐治疗（1条）
- R.静脉血栓的预防（4条）
- S.应激性溃疡的预防（3条）
- T.营养（12条）
- U.设置治疗目标（3条）

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early identification and management!

- Sepsis is life-threatening organ dysfunction caused by a dysregulated host response to infection. Sepsis and septic shock are major healthcare problems, affecting millions of people around the world each year, and killing as many as one in four (and often more) . Similar to polytrauma, acute myocardial infarction, or stroke, early identification and appropriate management in the initial hours after sepsis develops improves outcomes.

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Sepsis & Septic Shock
早识别! 早治疗!

谢谢