

· 专家共识 ·

发热伴血小板减少综合征感染防控
专家共识

胡立芬^{1,2} 龚磊³ 李春辉⁴ 殷俊⁵ 叶英^{1,2} 邵玉峰^{1,2} 杨帆⁶ 李军⁷ 瞿婷婷⁸
程君^{1,2} 尹华发⁹ 许夕海^{1,2} 伍婷^{1,2} 崔宁¹⁰ 王刚¹¹ 黄小平¹² 徐峰¹³
徐静¹⁴ 杨江华¹⁵ 饶建国¹⁶ 朱立雨¹⁷ 刘贞君¹⁸ 吴家兵³ 刘玮¹⁹ 李家斌^{1,2}

¹安徽医科大学第一附属医院感染病科,合肥 230022;²感染性疾病安徽省重点实验室,合肥 230022;³安徽省疾病预防控制中心,合肥 230022;⁴中南大学湘雅医院医院感染控制中心,长沙 410008;⁵安徽医科大学第一附属医院感染管理科,合肥 230022;⁶复旦大学附属华山医院医院感染管理科,上海 200040;⁷南京医科大学第一附属医院感染病科,南京 210006;⁸浙江大学医学院附属第一医院感染管理科,杭州 310003;⁹安徽省公共卫生临床中心感染科,合肥 230022;¹⁰信阳 154 中心医院感染科,信阳 464000;¹¹山东大学齐鲁医院感染病科,济南 250012;¹²苏州大学附属第一医院感染病科,苏州 215006;¹³浙江大学医学院附属第二医院感染病科,杭州 310009;¹⁴中国科学技术大学附属第一医院感染病科,合肥 230036;¹⁵皖南医学院第一附属医院感染性疾病科,芜湖 241001;¹⁶六安市人民医院感染科,六安 237000;¹⁷安徽医科大学附属巢湖医院感染疾病科,巢湖 238001;¹⁸安庆市立医院感染性疾病科,安庆 246003;¹⁹病原微生物生物安全全国重点实验室,军事医学研究院,北京 100850

通信作者:吴家兵,E-mail: wjb0386@126.com;刘玮,E-mail: lwbime@163.com;李家斌,E-mail: lijiaabin@ahmu.edu.cn

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【摘要】 发热伴血小板减少综合征(severe fever with thrombocytopenia syndrome, SFTS)是主要通过蜱虫叮咬使患者感染大别班达病毒(Dabie bandavirus, DBV)的新发传染病。2009 年首次在我国中部地区发热伴白细胞及血小板减少患者的血清中分离到该病原体,现在亚洲多个国家流行,重症患者死亡率高。近 10 年来,国内外关于 DBV 因人际传播而引发 SFTS 聚集性的疫情事件时有发生。尤其重症患者容易引起人际传播事件发生,在其抢救和治疗过程中因防护不规范易发生院内感染而导致医护人员感染病毒。因此,迫切需要制定防控 DBV 人际传播的合理措施,控制疫情蔓延,对临床 SFTS 重症患者的管理有重要的指导意义和临床价值。为了更好地规范 DBV 人际传播防控策略,研究邀请了该领域的知名专家进行深入讨论,在 SFTS 的流行概况、患者的血液和体液接触传播、病毒气溶胶传播、患者的污染物及遗体处理等关键防控措施方面达成了共识。

【关键词】 发热伴血小板减少综合征;大别班达病毒;人际传播;防控措施

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Expert consensus on prevention and control of severe fever with thrombocytopenia syndrome

HU Lifan^{1,2}, GONG Lei³, LI Chunhui⁴, YIN Jun⁵, YE Ying^{1,2}, GAO Yufeng^{1,2}, YANG Fan⁶, LI Jun⁷, QU Tingting⁸, CHENG Jun^{1,2}, YIN Huafa⁹, XU Xihai^{1,2}, WU Ting^{1,2}, CUI Ning¹⁰, WANG Gang¹¹, HUANG Xiaoping¹², XU Feng¹³, XU Jing¹⁴, YANG Jianghua¹⁵, RAO Jianguo¹⁶, ZHU Liyu¹⁷, LIU Zhenjun¹⁸, WU Jiabin³, LIU Wei¹⁹, LI Jiabin^{1,2}

¹Department of Infectious Diseases, The First Affiliated Hospital of Anhui Medical University, Hefei

230022, China; ²Anhui Province Key Laboratory of Infectious Diseases, Hefei 230022, China; ³Anhui Center for Disease Control and Prevention, Hefei 230022, China; ⁴Infection Control Center, Xiangya Hospital of Central South University, Changsha 410008, China; ⁵Hospital Infection-Control Department, The First Affiliated Hospital of Anhui Medical University, Hefei 230022, China; ⁶Hospital Infection-Control Department, Huashan Hospital, Fudan University, Shanghai 200040, China; ⁷Department of Infectious Diseases, The First Affiliated Hospital of Nanjing Medical University, Nanjing 210006, China; ⁸Hospital Infection-Control Department, The First Affiliated Hospital, Zhejiang University School of Medicine, Hangzhou 310003, China; ⁹Department of Infectious Diseases, Public Health Clinical Center of Anhui Province, Hefei 230022, China; ¹⁰Department of Infectious Diseases, The 154th Hospital, Xinyang 464000, China; ¹¹Department of Infectious Diseases, Qilu Hospital, Shandong University, Jinan 250012, China; ¹²Department of Infectious Diseases, The First Affiliated Hospital of Suzhou University, Suzhou 215006, China; ¹³Department of Infectious Diseases, The Second Affiliated Hospital, Zhejiang University School of Medicine, Hangzhou 310009, China; ¹⁴Department of Infectious Diseases, The First Affiliated Hospital of University of Science and Technology of China, Hefei 230036, China; ¹⁵Department of Infectious Diseases, The First Affiliated Hospital of Wannan Medical College, Wuhu 241001, China; ¹⁶Department of Infectious Diseases, Lu'an People's Hospital of Anhui Province, Lu'an 237000, China; ¹⁷Department of Infectious Diseases, Chaohu Hospital of Anhui Medical University, Chaohu 238001, China; ¹⁸Department of Infectious Diseases, Anqing Municipal Hospital, Anqing 246003, China; ¹⁹State Key Laboratory of Pathogen and Biosecurity, Academy of Military Medical Science, Beijing 100850, China
Corresponding authors: WU Jiabing, E-mail: wjb0386@126.com; LIU Wei, E-mail: lwbi@163.com; LI Jiabin, E-mail: lijabin@ahmu.edu.cn

【Abstract】 Severe fever with thrombocytopenia syndrome (SFTS) is an emerging infectious disease caused by Dabie bandavirus (DBV) transmitted through tick bites. It was initially identified in 2009 among febrile patients with leukopenia and thrombocytopenia in central China. SFTS has been recently reported in other Asia countries, resulting in high mortality among severely ill patients. In the recent 10 years, there have been some reports about human-to-human transmission of DBV, particularly among severely ill patients. However, there are currently no established prevention and control measures for medical staff during the clinical treatment for severely ill SFTS patients against human-to-human transmission. Improper precaution measure can cause nosocomial infection of DBV among medical staff during the clinical process of rescue and treatment. Therefore, it is crucial to develop preventive and control measures against DBV's human-to-human transmission, which would significantly contribute to the management of severely ill SFTS patients. To better regulate the precaution measures strategies against DBV human-to-human transmission, we have invited renowned experts in this field for extensive discussions, and reached a consensus on prevention and control measures concerning SFTS epidemiological features, contact transmission through patient's blood and bloody secretions, aerosol transmission, as well as patient's contaminants handling and corpse disposal.

【Keywords】 Severe fever with thrombocytopenia syndrome; Dabie bandavirus; Human-to-human communication; Precaution measures

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发热伴血小板减少综合征 (severe fever with thrombocytopenia syndrome, SFTS) 病死率高, 重症患者死亡率高达 10% ~ 40%^[1-6]。2017 年 WHO 将其与埃博拉病毒病、拉沙热等烈性传染病一起列为需优先关注的十大传染病之一^[7]。国家卫生

健康委员会 (原卫生部) 发布的《发热伴血小板减少综合征防治指南 (2010 年版)》规定参照法定乙类传染病要求报告和管理该病。

SFTS 致病病原体是大别班达病毒 (Dabie bandavirus, DBV), 曾称为发热伴血小板减少综合征

病毒 (severe fever with thrombocytopenia syndrome virus, SFTSV), 属于布尼亚病毒目 (Bunyavirales), 白纤病毒科 (Phenuiviridae), 班达病毒属 (*Bandavirus*)。被携带病毒的蜱虫叮咬是患者感染的主要途径, 也可通过密切接触患者血液或体液感染病毒。早在 2011 年已有 DBV 人传人病例报道^[8], 近年来关于人际传播引发的 SFTS 聚集性疫情在国内外报道中时有发生, 韩国和中国江苏省、山东省、河南省、湖北省、浙江省、安徽省、辽宁省等地区有文献记录的 DBV 人际传播事件就有 80 余次^[8-30]。尤其是临床医护人员在为重症患者进行诊疗时因防护不规范易引起院内感染, 为规范 DBV 人际传播防控策略, 在综合国内外该领域研究发现的的基础上, 经多学科专家 (包括临床、疾病预防与控制、临床微生物学和感染与控制等专业) 讨论与修改后形成本共识, 旨在对临床防控 DBV 人际传播提供策略。本研究结果适用于 DBV 人际传播防控的专业指导, 不能作为医疗相关法律法规依据。

1 病原学

DBV 是单股负链 RNA 病毒, 病毒颗粒呈球形, 直径为 80~100 nm, 外有脂质双层包膜, 表面有棘突。DBV 对紫外线和热敏感, 60 °C 30 min 可灭活病毒, 对脂质溶剂或去污剂以及强酸、碱、戊二醛、含氯消毒剂等敏感^[31]。病毒在 25 °C 6 h 环境中, 物体表面的病毒仍具有感染性, 4 °C 环境中 1 周内感染性可保持稳定^[31]。病毒在吸水性材料 (无纺布、纸片类物质) 表面的感染活力降低更快, 通风干燥环境中可使病毒感染性下降^[32]。酒精消毒剂与其他消毒剂联合使用, 才能有效灭活 DBV^[32]。

2 流行概况

SFTS 最早在河南省信阳市被报道, 近年流行区域不断扩大, 目前我国多省份均有病例报道。SFTS 在国内分布以散发为主, 但呈地区和时间聚集性。主要集中在山东省、河南省、安徽省、湖北省、辽宁省、浙江省、江苏省的山区和丘陵地带, 报告病例数占病例总数的 99% 以上^[33]。国际上, 日本、韩国、越南、缅甸、泰国和巴基斯坦等国家也陆续报道 SFTS 病例^[5-6, 34-38]。长角血蜱作为 DBV 的传播媒介, 在全球范围内广泛存在, 导致 SFTS 全球流行风险增加^[39-40]。

人群对 SFTS 病毒普遍易感, 但大多数患者 (93.3%) 年龄为 40~84 岁^[6]。参加农业活动、放牧、徒步旅行、在蜱虫繁殖的环境中露营以及高风险地区居住的人群感染 DBV 的风险较高^[6]。接触 SFTS 患者的家属、医护及陪护人员也有感染风险。

3 传染途径与防控措施

3.1 蜱虫叮咬与动物接触传播 蜱虫叮咬是 SFTS 的主要传播途径, 长角血蜱可以跨期和经卵传播 DBV, 因此被认为是 DBV 的主要传播媒介兼储存宿主。蜱虫主要叮咬人或者动物皮肤较薄、不易被搔动、温度相对较高的部位, 例如人体的头皮、腰部、腋窝、腹股沟、生殖器等部位, 以及相对容易裸露的脚踝部位。但有 >50% 的临床病例未报告明确的蜱虫叮咬史, 说明存在其他自然疫源地传播方式或者存在对蜱虫认知度较低的现状。长角血蜱可广泛寄生于家养动物如羊、牛、猪、猫、犬、鸡等, 因此其寄生动物作为 DBV 的扩增宿主, 会造成传染源风险增大^[41], 需引起关注。研究证实, 猫感染 DBV 后出现症状甚至死亡, 病猫的血清、唾液、眼拭子、尿液、肛拭子中均可以检测到高载量的病毒^[42]。日本已多次报道感染 DBV 的病猫作为传染源感染人类的病例^[43-46]。獾、刺猬、针毛鼠等野生动物是 DBV 的扩增宿主^[47-48], 需关注是否可作为传染源感染人类。临床诊疗中对于怀疑 SFTS 的患者要注意检查是否携蜱虫就诊, 询问蜱虫叮咬史, 用正确方式拔蜱虫。

推荐意见 1: 对疫区内高风险人群加强科学健康教育, 提高对蜱虫及高风险动物的认知能力, 在 SFTS 流行区域及流行季节要防控蜱虫叮咬, 检查家养动物是否被蜱虫叮咬。

推荐意见 2: 在流行区域及流行季节, 加强对寄生蜱虫和游离蜱虫的密度监测, 同时对收集到的蜱虫进行 DBV 核酸检测。监测密度及检测阳性率数据作为预警依据, 开展综合防治, 以降低 SFTS 发病率。

推荐意见 3: 发现被蜱虫咬伤人员, 应先用酒精涂抹, 然后用尖头镊子取出蜱虫, 并用碘伏清洁伤口。潜伏期内注意被叮咬者体温、消化和神经系统的相关症状。

推荐意见 4: 临床怀疑 SFTS 的患者需询问蜱虫叮咬史及动物饲养史, 并仔细查体, 注意是否携蜱虫就诊, 用正确方式拔蜱虫。

推荐意见 5: 医护人员拔蜱虫时需佩戴一次性乳胶手套、医用外科口罩及帽子防控病毒感染, 蜱虫作为感染性物质消毒后规范处置。

3.2 人际传播 临床研究已证实感染 DBV 的患者可作为传染源, 通过血液、体液接触传播, 甚至可能通过气溶胶方式导致人际传播^[8-30]。感染 DBV 的患者, 常出现漏诊、误诊或延误入院治疗的情况, 不仅易导致病情加重和增加病死率^[49-50], 而且具有成为潜在传染源在家庭成员间引起传播的风险。因此, 患者早诊断、早管理有利于及时防控病原体的传播。

推荐意见 6: 对高风险人群加强科学健康教育, 提高对 DBV 的认知水平, 增强社区医生对 SFTS 的早期识别和疑似病例的诊断能力, 预防家庭聚集性感染发生。

3.2.1 患者血液或体液直接接触传播 研究已证实 DBV 可通过人际传播引起聚集性感染发生, 接触患者的血液或体液是造成 DBV 人际传播的重要危险因素, 尤其大量出血的重症患者发生人际传播的风险较高^[9-11, 13, 16, 21, 23, 25-26]。DBV 人际传播引发的聚集性疫情分析显示, 原代感染病例多是病危死亡患者, 并且患者在死亡前 24 h 都有出血症状^[23], 血液接触可导致人传人感染发生率增加 25 倍^[23]。此外, 患者血性体液、尿液及粪便排泄物可检测到 DBV 病毒。临床证实医护及陪护人员在无防护或防护不充分的情况下直接接触患者血液或血性呼吸道分泌物发生感染的风险高^[13, 16, 21]。

接触危重患者的医护、家属或陪护人员发生感染风险高, 应采取合理防护措施, 如加强排泄物管理。医护人员在对 SFTS 患者诊治中, 要密切观察患者有无出现呕血、咯血、便血、血尿等症状, 与出血患者接触时, 根据标准预防概念, 严格遵守常规血液和体液预防措施, 并告知陪护人员感染风险及防护措施。收治重症出血患者的病房需配备医用外科口罩、手套、护目镜、防护面罩、隔离衣、防水围裙等防护用品。医疗工作经验不足的医护人员需加强防护培训, 若黏膜、伤口被患者血液、体液污染或可能污染时应立即用流水彻底冲洗干净, 再根据部位给予消毒处理。SFTS 患者临床管理过程中, 需强调标准预防概念。

韩国研究显示, 医护人员参加患者心肺复苏术 (cardiopulmonary resuscitation, CPR)、接触患者血液或体液、医疗工作经验不足和未合规佩戴防护用品与人际传播发生相关, 其中暴露于患者血

液或体液是感染 DBV 的独立危险因素^[27]。临床证实医护及陪护人员在无防护或防护不充分情况下直接接触患者血液或血性呼吸道分泌物发生感染风险高^[13, 16, 21]。DBV 聚集性感染事件的研究显示, 重症患者口咽部、尿液及粪便可检测到 DBV, 咽拭子病毒载量相对较高, 未充分防护且近距离和长时间接触出血患者是发生感染的危险因素, 佩戴医用外科口罩和护目镜或防护面屏可防止人传人事件发生^[26]。另也有家庭聚集性 DBV 感染发生报道^[28-29]。

推荐意见 7: 参与患者止血及重症患者有创操作的医护人员, 需佩戴一次性帽子、一次性乳胶手套、医用外科口罩、护目镜或防护面屏, 有可能发生血液、体液、分泌物等大面积喷溅或者有可能污染身体时, 应穿隔离衣或防水围裙。

推荐意见 8: SFTS 患者临床管理中, 强调标准预防概念。医护人员在对 SFTS 患者诊疗中, 如果发生针刺伤暴露需立即从近心端向远心端挤出伤口血液, 然后用肥皂水和清水冲洗, 最后用碘伏清洁伤口。并密切监测暴露者潜伏期内体温、消化和神经系统的相关症状。

推荐意见 9: 医护人员在对 SFTS 患者诊疗中, 如果被患者血液喷溅污染, 需脱去污染工作服并消毒处理, 涉及喷溅面部及眼睛时, 应立即漱口并用生理盐水冲洗眼睛。

推荐意见 10: 对于 SFTS 患者的陪护人员, 需告知其 DBV 存在人际传播感染的风险及做好必要的防护措施。

3.2.2 飞沫及气溶胶传播 气溶胶传播是指飞沫在空气悬浮过程中失去水分而剩下的蛋白质和病原体组成的核, 形成飞沫核, 可以通过气溶胶的形式漂浮至远处, 造成远距离的传播。在临床诊疗中吸痰、气管插管等医疗操作发生病原体气溶胶传播风险大。研究显示在气管插管患者病房的床护栏、门把手、听诊器、电视机顶部、水槽台等多处样本检测到 DBV RNA 呈阳性, 多处病毒阳性部位与患者血液体液无直接接触, 临床研究推测重症患者尤其气管插管患者病房有气溶胶病毒颗粒造成环境污染的可能^[51]。临床多项研究显示 DBV 可通过气溶胶引起人与人传播^[15, 20]。实验室通过 DBV 气溶胶在密闭容器中感染小鼠, 发现小鼠肺部及脾脏均检测到病毒, 且肺部有较高的病毒载量, 动物实验证明了 DBV 可通过气溶胶传播^[52]。

研究显示, 高病毒载量的重症患者在有创操作

时有气溶胶传播病毒的风险,医护人员在参与 SFTS 患者气管插管和频繁通过口腔抽吸血性分泌物时,建议佩戴 N95 型口罩或同等防护品及面罩防控气溶胶传播^[20]。Hu 等^[26]临床研究发现,SFTS 出血的重症患者在 CPR 诊疗时存在病毒气溶胶传播风险,与 SFTS 出血患者面对面接触距离<50 cm 及接触时间>30 min 的 8 人中,6 人被感染,但其中佩戴 N95 型口罩的医生参与抢救时间>1 h 未发生感染,提示佩戴医用防护口罩及防护面屏可防控人传人传播的发生。

SFTS 重症患者通过血液或血性分泌物排出病毒在局部空间有引起气溶胶传播的风险,尤其在吸痰、CPR 抢救治疗、气管插管及拔管操作时,气溶胶传播引起医护人员发生感染的概率高,可能由于需要 CPR 及气管插管治疗的患者呼吸道及口腔分泌物多,造成局部的飞沫及气溶胶病毒浓度高导致感染风险大。针对重症患者有创诊疗时需加强标准预防概念,必要时使用防护飞沫及气溶胶的设备。

推荐意见 11:宜设置独立的病房单元(或集中在同一病房)收治重症患者,并加强病房的通风和室内空气的消毒。日常消毒时患者的床单元如床头柜、床栏等物体表面及呼吸机、监护仪等医疗设备使用有效的消毒湿巾或 500~1 000 mg/L 含氯消毒剂进行擦拭消毒,空气则采用空气消毒机或紫外线进行消毒。终末消毒时患者的床单元可采用含氯消毒剂、紫外线或臭氧进行消毒。

推荐意见 12:当患者需要气管插管和呼吸机辅助通气时,可采用密闭式吸痰方法排痰以防止病毒飞沫的生成。

推荐意见 13:当医护人员为重症病人进行吸痰、口腔护理、支气管镜检查或气管插管等可能产生喷溅的医疗操作时,应穿戴一次性帽子、医用防护口罩、一次性乳胶手套、护目镜或防护面屏及隔离衣。并做好床单元及环境物品的即时消毒,方法参考推荐意见 11。

4 终末消毒及遗体处理

发生 DBV 人际传播聚集性疫情的首发病例多为死亡病例,已有多起家属参与遗体清理及参加葬礼发生感染事件的报道,家属及工作人员由于缺乏相关专业知识和必要的防护措施,所以处理死亡患者遗体时发生感染风险高^[8,15,20,30]。无防护或防护不充分下处理患者遗体的血性分泌物有感染 DBV

风险^[8,15,20]。

高病毒载量死亡患者排泄物污染的衣物应消毒处理后销毁。相关人员在清理高病毒载量患者遗体时,需落实穿戴隔离衣、手套、医用防护口罩、护目镜或面罩等综合防护措施。对于放弃治疗自动出院的重症患者,建议报告相关部门,加强环境消毒。家属在家自行拔除置管如气管插管、胃管等导致的血液、体液接触传播发生感染风险大,需做好防护。对于部分病程较长因合并细菌、真菌感染而死亡的患者,DBV 病毒量已下降或转阴的发生人际传播的概率会减少,因此建议患者病程中动态检测病毒量用于病情评估及人员防护措施制定。

推荐意见 14:被患者的血液、血性分泌物或排泄物污染的物品和环境,按消毒对象应采取高温、高压或 2 000~4 000 mg/L 含氯消毒剂等方式进行消毒处置。

推荐意见 15:接触高病毒载量病人遗体的人员,需落实穿戴隔离衣、手套、口罩、护目镜或面罩等综合防护措施。出血患者遗体用 2 000~3 000 mg/L 含氯消毒剂浸润的双层布单包裹,装入双层尸体袋后送至殡仪馆火化。

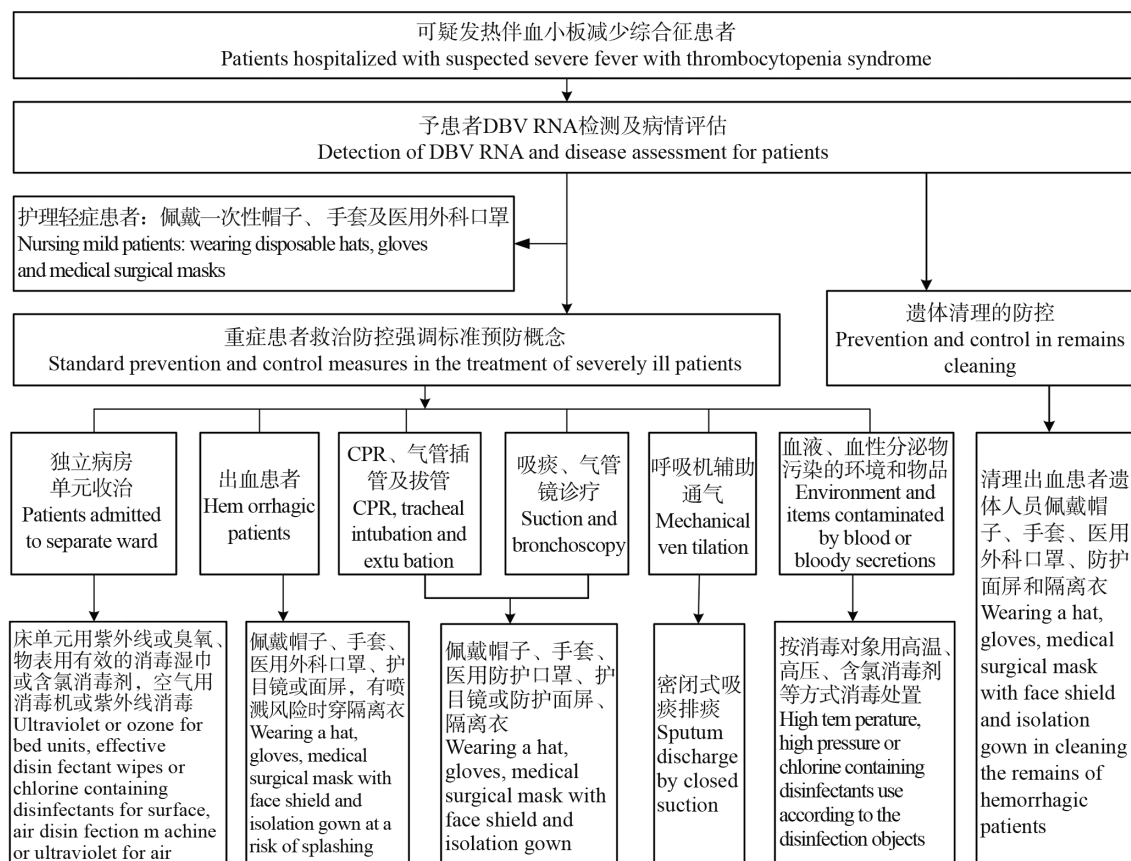
5 院内感染防控

患者家属、陪护及医护人员是 DBV 人际传播的高风险人群,为病人进行诊疗及护理时需加强自身防护,避免 DBV 人际传播引起的聚集性疫情发生。在家属及陪护人员护理过程中,要正确佩戴口罩、手套等,禁止无防护情况下直接接触患者血液、体液、污染衣物及患者遗体。医护人员在对 SFTS 患者临床管理过程中,需强调标准预防概念,对患者进行诊治时,规范防护、避免直接接触污染物。高风险人群暴露病毒后潜伏期内注意休息、加强营养,提高免疫力,密切关注消化道、神经系统症状及体温变化。具体防控流程见图 1。

6 小结

DBV 主要通过蜱虫叮咬感染人类,也存在人际间传播感染风险,如防控不当可引起家庭内、医院内聚集性感染疫情发生,给人民生命健康带来严重威胁。本共识旨在指导防控 DBV 虫媒感染及患者诊疗中人际传播发生,按照标准预防概念规范院感防控措施,减少院内感染事件发生。

利益冲突 无



CPR: 心肺复苏术; DBV: 大别班达病毒; RNA: 核糖核酸。

CPR: cardiopulmonary resuscitation; DBV: Dabie bandavirus; RNA: ribonucleic acid.

图 1 发热伴血小板减少综合征院内感染防控流程图

Figure 1 Flow chart of prevention and control strategy against nosocomial infection for severe fever with thrombocytopenia syndrome

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本文编辑: 韦思彤(中文)

李宝珠(英文)