

ECMO联合IABP救治围产期心肌病患者1例并文献回顾

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摘要

围产期心肌病是一种罕见的妊娠晚期或产后女性的特发性左心室功能障碍, 当药物治疗无效时可通过机械循环支持治疗为康复或心脏移植争取时间。我们报告了一名急性重症围产期心肌病病例, 患者剖宫产术中发生心源性休克, 术后应用大剂量升压药血压难以维持, 予以ECMO、IABP改善患者心脏灌注及心室运动, 最终患者5天后撤除VA-ECMO, 1月后随访LVEF改善至67%。因此, 在患有难治性心力衰竭的围产期心肌病患者中, 机械循环支持尤其是ECMO可作为患者恢复的桥梁, 缩短患者病程、改善患者预后。

关键词

围产期心肌病, 心源性休克, 体外膜肺氧合, 主动脉内球囊反搏

ECMO Combined with IABP in the Treatment of a Patient with Peripartum Cardiomyopathy: A Case Report and Literature Review

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Abstract

Peripartum cardiomyopathy (PPCM) is a rare idiopathic left ventricular dysfunction that occurs in

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women during late pregnancy or the postpartum period. When pharmacological treatments are ineffective, mechanical circulatory support (MCS) can be utilized to buy time for recovery or heart transplantation. We report a case of acute severe PPCM in which the patient developed cardiogenic shock during a cesarean section. Postoperatively, despite the administration of high-dose vasopressors, her blood pressure remained unstable. Extracorporeal membrane oxygenation (ECMO) and intra-aortic balloon pump (IABP) were initiated to improve cardiac perfusion and ventricular function. The patient was successfully weaned off venoarterial ECMO (VA-ECMO) after 5 days, and follow-up at one month revealed significant improvement in left ventricular ejection fraction (LVEF) to 67%. This case demonstrates that mechanical circulatory support, particularly ECMO, can serve as a bridge to recovery in patients with refractory heart failure due to PPCM, potentially shortening the disease course and improving prognosis.

Keywords

Peripartum Cardiomyopathy, Cardiogenic Shock, Extracorporeal Membrane Oxygenation, Intra-Aortic Balloon Pump

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1. 引言

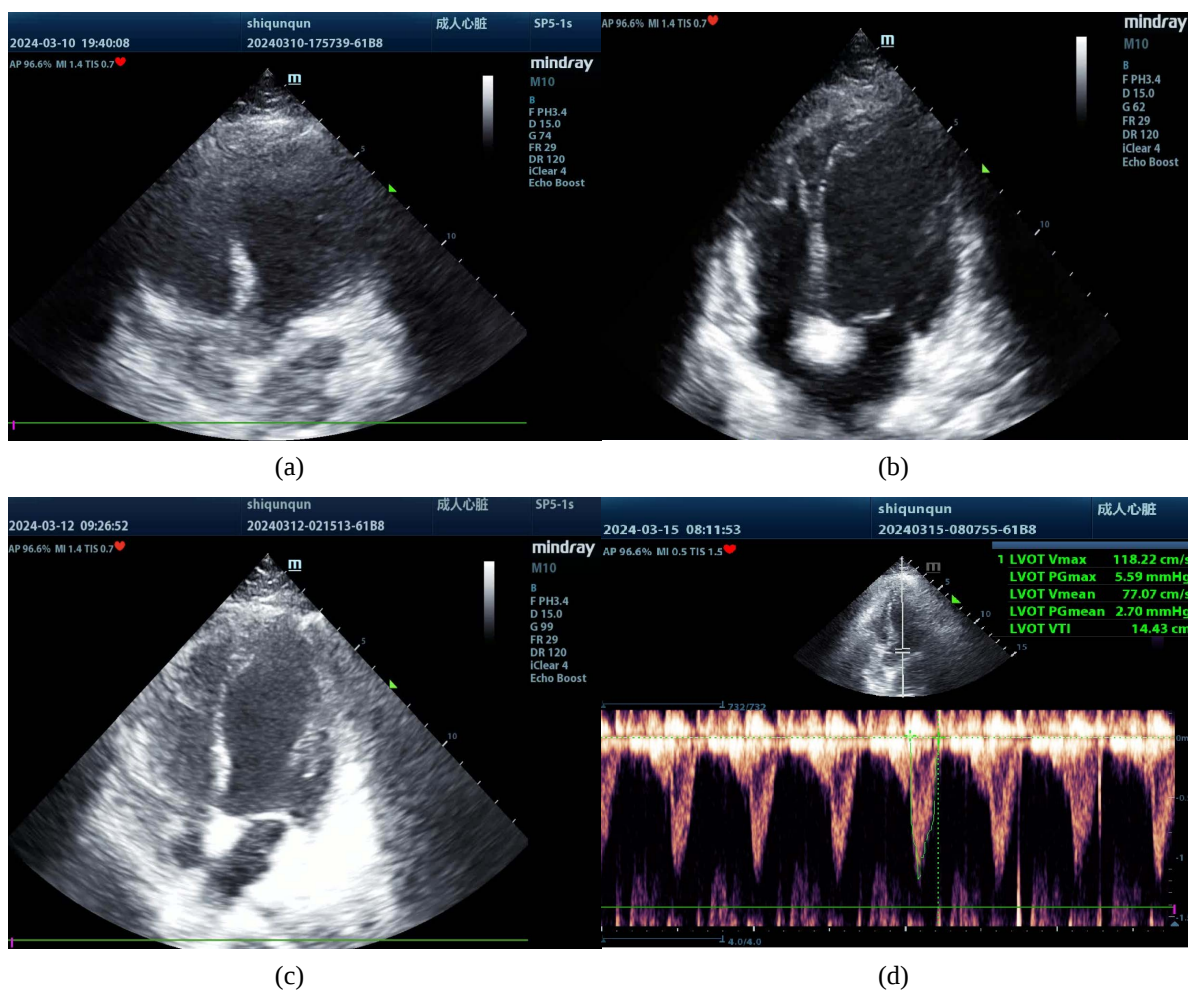
围产期心肌病(peripartum cardiomyopathy, PPCM)是一种潜在的危及生命的特发性心肌病,定义为妊娠晚期或分娩(或妊娠终止)后数月内发生的、无其他明确原因可以解释的射血分数降低(通常低于 45%)的心力衰竭(heart failure with reduced ejection fraction, HFrEF) [1]。2020 年全球调查研究中围产期心肌病发病率为 1/3000~15,000 例[2], 每年 PPCM 患者病死率在 5%~20%之间[3]。围产期心肌病的病因及发病机制目前尚不明确,其可能包括炎症、病毒性心肌炎、免疫异常或血流动力学异常、凋亡、激素异常,氧化应激增加、营养不良和遗传因素等多种因素,危险因素包括多胞胎、年龄 > 30 岁、子痫、肥胖、糖尿病和复杂性妊娠期高血压等[4]-[8]。患者通常表现为左心衰,症状从轻度心功能不全到明显的心源性休克。PPCM 的诊断多采用 Hibbard 诊断标准: 1) 既往无心脏病史且妊娠前 1 个月无其他致使心功能不全的因素; 2) 妊娠晚期至产后数月内发生的心功能衰竭; 3) 超声心动图标准: LVEDd > 2.7 cm/m²; LVEF < 45% 和(或) LVFS < 30% [1] [8]。PPCM 治疗主要分为急性期及慢性期,对于伴有血流动力学不稳定的孕妇应立即分娩,以避免潜在的母婴并发症。急性期发生心力衰竭时治疗主要以缓解心衰症状、恢复心功能,并应依从急性或慢性心力衰竭管理指南来制定治疗方案,当药物治疗失败时,治疗方案应考虑机械循环支持系统(mechanical circulatory support, MCS),包括主动脉内球囊泵(IABP)、静脉-动脉体外膜肺氧合(VA-ECMO)和临时心室辅助装置(VAD) [4] [9] [10]。对于难治性心源性休克合并血流动力学不稳定患者,静脉-动脉体外膜肺氧合(VA-ECMO)治疗可为患者恢复心肌功能提供缓冲时间。在这里,我们报告了一例 ECMO 联合 IABP 救治急性重症围产期心肌病病案。我们复习所有的现有文献并对以往的案例进行回顾总结,对于早期心功能衰竭未能通过药物控制时,应迅速采用单种甚至联合机械循环支持治疗。

2. 病例报告

患者,女,40 岁,G5P1,既往 1 型糖尿病史 7 年,长期血糖控制不佳。2024 年 3 月 8 日因“停经 34+3 周,阵发性腹痛 6 小时”入院,胎监发现晚期减速,尿酮体阳性,考虑合并糖尿病酮症酸中毒、胎

儿窘迫、子痫前期(重度),排除手术禁忌后于全麻下急行剖宫产术,患者术中出现血压下降,予以补液、血管活性药物维持血压,术后转入重症医学科,血管活性药物用量不断增加,血压 60/40(39) mmHg(肾上腺素 0.4 ug/kg·min,去甲肾上腺素 0.5 ug/kg·min),听诊双下肺可闻及湿性啰音,查血气分析: pH 6.91, PCO₂ 19.5 mmHg, PO₂ 11.2 mmHg, FiO₂ 100%, Lac 1.89 mmol/L, 葡萄糖 20.29 mmol/L, 实际碳酸氢盐 3.94 mmol/L; 心超检查提示心肌收缩力和射血分数不断下降, LVEF15%(图 1(a)), 胸部 X 线片提示双侧肺水肿, 经升压、补液扩容、抗休克治疗后效果不佳, 行气管插管机械通气(模式 PC 25 cmH₂O, FIO₂ 100%) 氧合指数小于 100, 经积极治疗后休克难以纠正, 排除禁忌后为产妇行 VA-ECMO, 术后患者转入我院重症医学科 ABP 82/42(55) mmHg(肾上腺素 0.4 ug/kg·min, 去甲肾上腺素 0.5 ug/kg·min); ECMO 支持(转速 3350 r/min, 血流速 3.03 L/min, 气流量 4 L/min, 氧浓度 100%)。

患者入院后持续无尿, 予以 CRRT 维持容量负平衡, 溴隐亭抑制催乳素释放, 哌拉西林钠他唑巴坦钠、磷酸奥司他韦、更昔洛韦抗感染, 缩宫素及镇静镇痛, 血管活性药物维持血压等治疗, 考虑患者心功能差, 脉压差低, 为强心、保证心室射血分数、预防心脏血栓形成, 予以尼卡地平扩血管减轻后负荷。入院后第 1 d, 患者心肌损伤指标仍持续升高, TNI 6.03 ng/mL; BNP: 2116.7 pg/mL, 床旁心脏超声示患者左心室明显扩大, 压力过高(图 1(b)), 右心显著受压, 考虑液体管理、扩血管治疗后患者仍存在左心室后负荷过重, 我们行 IABP (ECG 触发, 1:1 反搏) 以进一步卸除左心室后负荷改善心脏灌注; 入院第 2 d 患者复查 TNI 2.036 ng/mL, BNP: 2621.0 pg/mL; 床旁心脏超声示室壁运动较前好转(图 1(c)), 入院后第 5 d



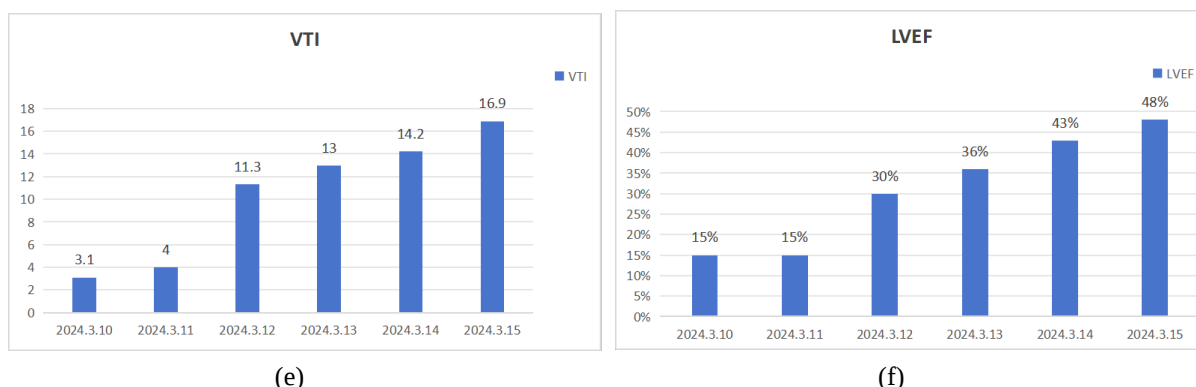


Figure 1. Changes in echocardiography of the patient's heart and left ventricular ejection fraction

图 1. 患者心脏超声及左室射血分数变化

患者床旁超声心动图示心功能改善, LVEF 48% (图 1(d)), ECMO 转速下调至 2370 r/min, 血流速 1.2 L/min, 循环稳定, 停机并撤除 ECMO, 停用血管活性药物, 尿量增加至 2800 mL/24h, 停用 CRRT。入院第 6 d 撤除 IABP 后患者循环稳定, 心率 95~110 次/分, ABP 105~135/60~85 mmHg; 于入院第 7 d 时脱机, 患者心率、血压及呼吸频率无显著改变, SPO₂ 99% 以上; 予以拔除气管插管, 转回妇产科普通病房并顺利出院。住院期间患者心脏超声及左室射血分数变化如图所示(图 1(e), (图 1(f))。1 月后门诊复查心平扫及灌注无明显异常, 右心 EF 66%、左心 EF 67%。

A 患者刚入院时心脏超声: 左室扩大, 左房扩大, 主动脉反流(轻度), 二尖瓣反流(中度), 三尖瓣反流(轻度), 左心功能减低, 右心功能减低, EF 15%, VTI 3.1 cm; B 患者入院第 1 d 心脏超声: 左心功能减低, 右心功能减低, 左室扩大, 二尖瓣反流(中度) EF 15%, VTI 4 cm; C 患者入院第 2 d 心脏超声: 左室扩大(轻度), 左心功能减低, EF 15%, VTI 11.3 cm; D 患者入院第 5 d 心脏超声: 主动脉瓣反流(轻微), 左心功能减低, EF 48%, VTI 16.9 cm; E、F 患者入院后 VTI、左室射血分数变化趋势。

3. 讨论并文献复习

围产期心肌病是一种罕见且非常严重的特发性心肌病, 以左心收缩功能障碍为主要表现, 在既往健康的女性中, 多见于在怀孕的最后一个月或分娩后长达 5 个月内[11]。怀孕期间的血流动力学变化可能会掩盖心肌病表现, 妊娠期间产妇心输出量增加, 左心房、左心室容积增加, 左心收缩力增加, 并在产后迅速降低, 引起心脏暂时性、可逆性肥厚变化[12]。妊娠期间激素水平波动, 雌激素控制血管功能、炎症反应、代谢、胰岛素敏感性、心肌细胞存活、线粒体功能、肥厚的发生并最终起到心脏保护作用, 有助于维持怀孕期间有效的血管适应; 高水平黄体酮水平可促进血管紧张素 I (Ang I) mRNA 上调, 引起血管收缩、炎症、纤维化、细胞生长和液体潴留, 与血管舒张和血压的快速下降有关[13]。

ESC 的 PPCM 专家共识中提出了 PPCM 急性发病者的药物治疗可以用“BOARD”来概括: B 溴隐停 (Bromocriptine) O 口服抗心衰治疗 (Oral heart failure therapies) A 抗凝药物 (Anticoagulants) R 血管扩张剂 (vaso-Relaxing agents) D 利尿剂 (Diuretics)。药物难治性的心源性休克患者可通过体外循环装置成功过渡到康复[4], 主动脉内球囊泵、经皮左心室辅助装置和静脉动脉体外循环装置均可用于妊娠期和产后期[14]-[16]。VA-ECMO 可有效降低心脏前负荷 40%~60% [17], 为患者提供有力的机械循环支持。另一方面, 大流量的 VA-ECMO 可导致左心室后负荷增加, 左心室收缩功能障碍后左房压升高、左心室过度扩张、诱发或加重肺水肿甚至出现心肌顿抑, 主动脉瓣开放异常, 血流瘀滞、血栓形成风险增加, 左室射血分数会进一步降低, 心脏灌注异常, 心肌细胞损伤进一步加重, 成为后期心脏康复的障碍。据现有文献报道, 在 VA-ECMO 辅助成人心源性休克中, 左心室后负荷减少与患者死亡率降低相关[18]。常见的降低左心室后负荷

方法如液体管理或通过药物治疗来降低动脉血管的阻力。例如,利尿剂、血管扩张剂等药物扩张血管,降低外周阻力,从而减轻心脏的负荷,ECMO 患者心功能异常,其通常需血管活性药物维持血压,外周灌注不足,予以扩血管药物后,患者可能出现血压降低、四肢末端、肠道、肾脏等灌注进一步减少,脏器衰竭可能,需准确调节心房内压力与外周血管阻力间关系。最后,当药物等治疗方法无效时,可采用其它心脏辅助装置卸载左心室[19]。左心室辅助装置(LVAD)可以通过连接到心脏,将血液从左心室抽出,并将其输送到主动脉,从而绕过受损的心脏部分,减轻心脏的工作负担。主动脉球囊反搏(IABP)在心脏舒张期通过主动脉内的气囊膨胀增加冠脉血流,在心脏收缩期气囊放气,降低心脏的工作负荷,增加流向大脑和肾脏的血流量,在 VA-ECMO 的基础上提供约 15%的额外循环支持,从而进一步改善血流动力学,促进心脏功能恢复[20]-[22]。其它外科治疗方式如经主动脉左室插管、经主动脉猪尾巴插管和肺动脉插管、左室心尖部插管引流、经皮穿刺房间隔造口术等[23],多见于病例报道,其临床价值需进一步探究。该案例中患者 VA-ECMO 治疗后左心室后负荷增加,我们提前减轻液体负荷并尼卡地平药物治疗减轻 ECMO 后患者左心室后负荷,通过床旁心脏超声发现仍存在右心受压明显,考虑患者,需行进一步减轻左心室负荷相关治疗,因此,我们通过联合 IABP 降低左心室后负荷改善患者左心室功能形态及血流动力学,最终治疗效果良好。

围产期心肌病患者的心肌恢复相较于其它类型心肌炎、心肌病具有更好的结局,后期随访中多在 3-6 个月恢复[24][25],完全恢复的患者在基线时更有可能具有更高的左心室射血分数和更小的左心室收缩末期尺寸;本案例为中年女性、妊娠晚期起病,既往糖尿病史,无心脏病史,存在高龄、糖尿病酮症酸中毒、重度先兆子痫及感染等危险因素,心超提示左室壁收缩活动明显减弱,射血分数 15%,早期出现心源性休克及多脏器功能衰竭,但产科及重症医学科间通过良好科室联合诊疗,应用 ECMO 联合 IABP 改善患者循环灌注,及时积极干预,预后良好。遗憾的是由于患者病情进展迅速,时限短,并未予以完善发病期心脏 MR 及心肌细胞病理活检以明确诊断。

围产期心肌病是一种罕见但严重的疾病,影响着世界各地的女性。目前仍为一种排除性诊断,其潜在的病理生理学尚不清楚?妊娠期患者 ECMO 液体管理及血流动力学相关影响应如何监测及干预,对 PPCM 患者来说改善心功能预后的影响因素有哪些?如何对 PPCM 恢复的女性进行后续心功能预测等诸多问题目前还未有定论,需进一步研究与探讨。

声 明

该病例报道已获得病人的知情同意。

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