

• 综述 •

再生育需求女性剖宫产疤痕憩室诊治进展

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[摘要] 剖宫产疤痕憩室(cesarean scar diverticulum, CSD)是剖宫产手术的远期并发症之一,可引起异常月经模式、慢性盆腔痛等症状,严重影响患者的生活质量。目前国内外对CSD尚无统一的诊治标准,手术治疗是有再生育需求患者的首选治疗方式,但具体术式的选择、不同术式对后续生育能力的影响仍存在争议。文章总结近5年来国内外学者对CSD的研究结果,就CSD的形成因素、诊断方法、治疗方式及对后续生育的影响进行综述,为优化临床诊疗策略提供参考。

[关键词] 剖宫产疤痕憩室;继发性不孕;疤痕处残余肌层厚度;生育结局

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Progress in the study of cesarean scar diverticulum in women with re-fertility requirement

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[Abstract] Cesarean scar diverticulum (CSD) is one of the long-term complications of cesarean section, which can cause symptoms such as abnormal menstrual patterns and chronic pelvic pain, significantly affecting the quality of life of patients. Currently, there is no unified standard of diagnosis and treatment for CSD. Surgical treatment was considered to be the primary option for patients with fertility requirements, but the specific selection criteria of surgical procedures and the impact of different surgical procedures on subsequent fertility remain controversial. Here, we summarize recent research findings on CSD from scholars around the world over the past 5 years, reviewing the factors contributing to the CSD formation, diagnostic methods, treatment options, and their effects on the future fertility, in order to provide a references for optimizing clinical strategies.

[Key words] cesarean scar diverticulum; secondary infertility; residual myometrium thickness; reproductive outcomes

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剖宫产疤痕憩室(cesarean scar diverticulum, CSD),或称剖宫产子宫切口疤痕缺损,指剖宫产术后子宫切口愈合不佳致使子宫肌层出现与子宫腔相通的缺陷,因该缺陷形似“蓄水池”、“囊袋”,也可称之为“憩室”,是剖宫产术后的远期并发症之一。近年来,随着生育政策的放开,越来越多的疤痕子宫患者再次加入生育行列,CSD导致的继发性不孕症受到更多学者的关注。目前对于有再生育需求

的CSD患者,妊娠前是否需要手术修补、具体的术式选择标准、不同术式对后续生育能力的影响等尚存在争议。

1 CSD病因

目前CSD具体机制尚无定论^[1-3],但研究指出多重因素影响CSD的形成。①剖宫产次数与CSD的发生率呈正相关,多次剖宫产的患者子宫肌层厚度更薄,形成CSD的概率更高^[4]。②剖宫产切口的常规位置在膀胱反折腹膜下1~2 cm,位置过高时,由于切口上下缘肌层厚度存在差异,缝合时对合不严,容易组织复位不良,从而导致CSD发生;反之当切口位置过低时,肌层供血不足且宫颈黏液在

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切口处积聚,容易感染,肌层愈合困难,也容易形成CSD^[5]。③切口缝合疏密或松紧度不当均可导致切口愈合不良,形成憩室。术中是否缝合子宫内层同样影响切口愈合。与间断缝合相比,连续缝合后的子宫肌层更易缺血,瘢痕处易形成缺损^[6]。单层缝合(不完全闭合)后的子宫肌层薄于双层缝合后的肌层,多数研究表明双层缝合较单层缝合更安全,再妊娠时子宫破裂的概率更低,但两种缝合方式术后CSD的发生率无明显差异^[5,7-8]。④缝合材料同样影响切口愈合及瘢痕憩室的形成^[2]。经单股可吸收缝线缝合的切口较多股可吸收缝线缝合的切口愈合更佳^[4]。⑤后位子宫也是CSD的易发因素之一,因其前壁下段在愈合过程中呈拉伸状态,加之瘢痕组织回缩,切口处张力大、血流灌注不足,导致切口修复效果差,形成CSD的风险高^[5]。⑥其他因素,如子宫瘢痕处与腹膜粘连同样是形成CSD的高危因素^[9]。此外,患者自身因素,包括体重指数、年龄、吸烟史、糖尿病史、双胎妊娠、妊娠期高血压病史、剖宫产术后切口感染、贫血等均与CSD的形成有关^[10-11]。

2 CSD诊断与临床表现

CSD目前尚无统一标准的定义,国内外文献中类似的描述词有:isthmocele、cesarean scar dehiscence、niche、cesarean scar pouch、uterine diverticulum等^[10]。欧洲憩室工作组(European Niche Taskforce)定义憩室为阴道超声下剖宫产瘢痕处凹陷至少2 mm^[11]。依据憩室深度可将CSD分为轻、中、重型:轻型指憩室深度<3 mm,多次检查憩室时有时无;中型指憩室深度介于3~<7 mm;重型指憩室深度≥7 mm,多次检查憩室均存在^[12]。

经阴道超声检查(transvaginal ultrasound, TVS)、磁共振成像(magnetic resonance imaging, MRI)、子宫输卵管造影、宫腔镜以及病理诊断是诊断CSD常用的辅助技术。TVS因具有快速、微创、成本低而被广泛应用于临床工作中,其中憩室周围血管指数、血管血流指数等三维超声参数不仅可用于CSD的诊断,还可作为治疗效果的评价标准^[13]。

宫腔镜检查因具有可直视的优点而被认为是诊断CSD的金标准^[14]。Chen等^[15]将宫腔镜检查下观察到的CSD特征分为5种表型:黏膜苍白型、囊肿样病变型、息肉样病变型、局部血管增生型及锯齿状缺损型。其中黏膜苍白型的发生率最高,占比超60%。值得一提的是,局部血管增生及锯齿状缺损型患者残余的子宫肌层厚度相比另外3种表型更

薄。但就月经持续时间以及经阴道修复后结局而言,上述5种表型无显著差异。

国外的一项研究将由CSD引起的一系列症状统称为剖宫产瘢痕综合征(cesarean scar disorder, CSDi)^[16],其原发症状包括:经间期点滴出血、子宫出血引发的疼痛、胚胎移植时导管插入困难、继发性不明原因不孕合并宫腔积液等;继发症状包括:性交困难/回避性交、阴道分泌物异常、慢性盆腔痛、异常子宫出血时引起的气味、继发性不明原因不孕、辅助生殖技术(assisted reproductive technology, ART)后继发不孕、负面情绪等。当排除宫颈发育不良、感染、病理性疾病、排卵或其他医源性因素等异常子宫出血的诱因后,患者符合CSDi的临床表现,同时超声检查发现瘢痕憩室时,可诊断为CSDi。剖宫产瘢痕妊娠、子宫破裂、胎盘增生谱系等与CSD相关的产科问题,则被认为是CSDi的并发症^[16]。

Mohr-Sasson等^[17]研究显示,瘢痕处残余肌层厚度(residual myometrium thickness, RMT)较薄的患者更容易出现经期大出血和经间期出血的症状;<2.5 mm的RMT可能与继发性不孕有关。此外,Al-Ghotani等^[18]报道了1例极为罕见的剖宫产瘢痕憩室伴闭经的案例,该患者通过经腹子宫瘢痕憩室修补手术恢复正常月经。

3 CSD对生育能力的影响

既往研究表明剖宫产妇女的后续生育能力会下降^[19-21]。宫腔微环境改变、子宫内膜容受性损伤、合并子宫内膜异位症或宫腔积液、患者心理性因素等都是剖宫产后继发不孕的诱因,但具体机制并不明确。

研究发现CSD通过触发某些特定的信号通路,使宫腔内白介素(interleukin, IL)-2等促炎性细胞因子增多、IL-8等妊娠保护性细胞因子数量降低,从而干扰精子进入宫腔及胚胎着床,损害生育能力^[22]。巨噬细胞及其分泌的细胞因子在伤口愈合过程中发挥着重要作用,而瘢痕缺损处肿瘤坏死因子(tumor necrosis factor, TNF)- α 、CD16蛋白等均过表达,使巨噬细胞极化异常,从而导致其清除死亡中性粒细胞的能力降低,局部组织持续微炎症、过度纤维化,子宫收缩力降低,胚胎着床受损^[23]。

此外,剖宫产患者宫颈微生物群中乳酸杆菌等有益菌数量降低、葡萄球菌等潜在危害菌数量增加,保护性脂肪酸被大量消耗,局部血管形成受到抑制,改变子宫内膜容受性,损害内膜蜕膜化,造成

继发不孕^[24-25]。

瘢痕憩室处合并子宫内膜异位症、局部腺肌病同样会造成继发性不孕^[26-27]。聚集的宫腔积液可能有胚胎毒性^[28], 对于体外受精治疗继发性不孕的患者, 卵巢刺激过度可能会导致CSD处产生积液, 进而增加胚胎移植的难度^[29]。另有一项问卷结果显示, CSD引起的不适症状影响患者的性功能, 降低受孕概率^[30]。

4 CSD治疗

无再生育需求的患者可考虑通过药物治疗缓解症状, 如口服避孕药、左炔诺孕酮宫内节育系统及中药等^[31]。有生育需求的患者可选择手术治疗CSD, 目的在于去除憩室内异常的内膜组织或增生血管, 改善宫腔环境, 同时增厚瘢痕处残余肌层, 降低再妊娠时子宫破裂的风险。手术方案包括宫腔镜手术、腹腔镜手术、阴式手术或开腹手术。迄今为止, 拟再生育患者最佳的手术方式和标准仍无统一指南, 但业界广泛认为手术干预可以提高CSD患者的临床妊娠率^[21, 32-34]。

既往研究表明, 手术方式的选择应综合考虑患者年龄、剖宫产次数、子宫位置、憩室的位置与RMT值等因素^[22]。目前国内专家共识指出, 宫腔镜手术适用于RMT ≥ 3 mm的患者, 术前需充分告知患者再次妊娠时存在子宫破裂的风险; 腹腔镜手术适用于RMT < 3 mm的患者^[21]。而在国外不同的研究中, 选择宫腔镜手术的RMT值则放宽为 $\geq 2\sim 3$ mm^[1, 35-38]。对于剖宫产次数较少的患者, 宫腔镜手术改善症状的效果也较好, 而对于瘢痕缺损距离宫颈末端较长的患者, 宫腹腔镜联合手术疗效更佳^[39]。值得一提的是, 宫腹腔镜联合手术在宫腔镜引导下行透光实验定位憩室的位置, 腹腔镜直视下缝合憩室边缘子宫肌层, 结束后可通过宫腔镜检查手术效果, 观察修复后的憩室情况, 在手术效益上同时具备宫腔镜和腹腔镜手术的优势, 可以更加有效地避免缝合不良或憩室残留的问题, 因此是目前临床较常用的手术方式。此外, 有学者建议瘢痕修补术中同时缝合圆韧带来矫正子宫位置, 以减轻瘢痕处的张力, 促进子宫肌层修复^[10, 40]; 另有学者建议在手术治疗后、妊娠前6个月内额外应用避孕药来促进子宫切口愈合^[32]。

4.1 宫腔镜手术

宫腔内置入宫腔镜镜头, 探查子宫底、双侧宫角、宫腔四壁, 仔细寻找CSD, 确认位置后在镜头直视下采用双极环形电极从憩室下缘向宫颈管方向

水平切割, 切除憩室下缘处增生隆起的纤维组织, 引流出憩室内的经血, 同时球形电极灼烧CSD内增生的内膜组织、息肉和血管^[41]。

宫腔镜手术可同时治疗子宫内膜息肉等病变。术中对瘢痕缺损表面进行烧灼, 切除憩室内增生的血管及蓄积物, 引出积血, 能够降低憩室内压力, 改善子宫下段的结构, 提高妊娠成功率^[35]。但由于无法增加憩室处残余肌层厚度, 甚至使瘢痕处肌层更薄弱, 再次妊娠时仍需警惕子宫破裂的风险。

4.2 腹腔镜瘢痕憩室修补术

即使术前超声或宫腔镜显示憩室范围很大, 但腹腔镜下仍不能见到明显的憩室, 因此腹腔镜手术多联合宫腔镜, 术中可选择切开憩室缝合或直接折叠缝合, 两种缝合方式均能一定程度上恢复憩室处解剖结构, 达到增厚子宫肌层、降低后续妊娠时子宫破裂风险的目的, 但优势各有不同^[38-39]。

4.2.1 腹腔镜瘢痕憩室切开缝合术

腹腔镜探查, 若有粘连先行盆腔粘连松解术。瘢痕憩室患者膀胱常常粘连于子宫瘢痕处, 需小心分离, 打开子宫膀胱反折腹膜, 充分下推膀胱, 暴露子宫颈峡部瘢痕部位。同步行宫腔镜, 探查宫腔, 调暗腹腔镜灯光, 行透光实验, 确认瘢痕憩室上下左右的范围, 切除瘢痕及憩室边缘组织至暴露新鲜子宫肌层, 可吸收线间断缝合子宫肌层。再次置入宫腔镜检查修补的憩室, 确认缺陷处修补完整, 退出腹腔镜, 关腹^[38-39]。

此种手术方式对手术医生的腹腔镜下缝合能力要求更高, 且再次妊娠时需等待1~2年的切口愈合期^[39]。

4.2.2 腹腔镜瘢痕憩室折叠缝合术

腹腔镜探查, 分离粘连, 打开子宫膀胱反折腹膜, 充分下推膀胱, 暴露子宫颈峡部瘢痕部位。同步行宫腔镜, 探查宫腔, 电凝去除憩室内增生的内膜或血管。行透光实验, 确定憩室的范围, 单极电钩或超声刀切除憩室范围内的浆膜面, 以便组织融合性生长, 可吸收线间断折叠缝合憩室上下缘加厚肌层。再次置入宫腔镜确认缺陷处修补完整^[42]。

此种手术方式手术操作过程相对简单, 直接将瘢痕处上下端肌层折叠缝合修复, 大大缩短术后避孕时间, 更适合生育需求迫切的患者^[42-43]。

4.3 经阴道瘢痕憩室修补术

经阴道暴露宫颈管, 钳夹宫颈前后唇牵拉宫颈, 横行切开阴道前穹隆顶端, 充分游离膀胱宫颈间隙, 钝性分离、上推膀胱至膀胱腹膜反折处。扩宫

条指引探查,在子宫前壁探及薄弱凹陷区即为憩室,切开憩室表面直至与宫腔相通,切除薄弱区及瘢痕组织,暴露新鲜子宫肌层,可吸收线连续缝合切口^[44]。

此种手术方式能够避开腹部组织,减少对腹部器官的损伤,更适合CSD位置较低的患者。但术中操作空间小,容易损伤膀胱,缝合也相对困难。文献报道,经阴道瘢痕憩室修补术后感染风险更高^[34,45-46]。

4.4 开腹瘢痕憩室修补术

剖腹探查,分离粘连,打开子宫膀胱反折腹膜,下推膀胱,暴露子宫颈峡部瘢痕部位。在子宫前壁触及薄弱区即为剖宫产瘢痕憩室,充分切除该薄弱区,重新缝合子宫肌层,逐层关腹。开腹手术具有手术视野清晰、手术操作相对简单的优点,但创伤更大,临床应用较少^[23]。

4.5 其他

越来越多的学者尝试开展机器人辅助技术,一项研究表明机器人和宫腔镜联合治疗CSD对减少出血量及后续产科并发症具有重要意义^[47]。Walker等^[48]采用一种在近红外与宫腔镜引导下应用机器人激光切除子宫瘢痕憩室的高精度技术治疗1例巨大子宫瘢痕憩室患者,术后无手术并发症,RMT较术前的1.4 mm增厚为10.0 mm。该手术的优点在于利用近红外结合宫腔镜可以精准定位瘢痕憩室的边界,进行更精细的病损切除。

Huang等^[49]研究首次评价了人体干细胞移植对子宫瘢痕憩室修补的疗效,患者术后CSD的形状和体积均得到改善,但月经异常等症状未得到明显缓解,且由于总体样本仅有10例,其有效性仍存在争议^[49]。关于干细胞移植修复CSD对患者后续妊娠影响的研究相对缺乏,有待进一步探讨。

5 CSD与再妊娠

CSD术后妊娠相关问题在近年来受到更多的关注。从术后随访患者生育结局来看,相比宫腹腔镜联合手术,单纯行宫腔镜手术的患者术后至妊娠间隔的时长明显缩短^[45];然而单纯宫腔镜和宫腹腔镜联合手术的妊娠成功率比较差异无统计学意义^[39]。在另一项回顾性研究中,阴道修补与宫腹腔镜联合手术修补术后活产率差异无统计学意义^[50]。关于术后妊娠晚期的并发症,仅有1例患者在行宫腔镜憩室切除后再妊娠时出现子宫瘢痕破裂,该患者既往有6次剖宫产史^[51]。然而,关于不同手术方式后续妊娠成功率、不良妊娠并发症等生育结局的研究总体有限。

既往研究建议允许妊娠的子宫下段肌层厚度

的临界值为2.5 mm^[52],但临床上几乎没有医生根据此临界值判断是否可以进行妊娠。最新研究发现子宫肌层厚度<4 mm是导致不良妊娠结局的独立危险因素^[53]。有学者认为,当患者距前次剖宫产2年及以上、无腹痛及异常子宫出血等症状,且超声诊断子宫切口处瘢痕愈合情况尚可时准备妊娠^[54]。基于对瘢痕妊娠、胎盘植入、子宫破裂等严重不良妊娠结局的顾虑,医生往往建议手术修补CSD的患者术后避孕1年或以上方可再次妊娠。而最新研究报道宫腹腔镜联合子宫瘢痕憩室折叠缝合术后仅需避孕3个月即可再次妊娠,更适合生育需求迫切的患者^[55]。

子宫瘢痕憩室的患者再次妊娠时,若受精卵着床于憩室腔隙内,则形成瘢痕妊娠,瘢痕妊娠在妊娠中晚期可进展为胎盘植入、前置胎盘、子宫破裂等,需尽早干预。瘢痕处子宫肌层愈合的情况决定了再次妊娠的分娩结局,再次分娩方式的选择仍是当前重要的研究热点。越来越多的患者剖宫产术后尝试阴道分娩,但剖宫产后阴道试产同时增加子宫破裂的发生率,因此提前预防、尽早识别、及时救治至关重要^[56]。在分娩前开展产前评估并排除相关风险,采取有效的干预手段,阴道分娩或许可成为剖宫产术后再次妊娠分娩的首选方式^[57]。

6 总结

CSD是剖宫产常见的并发症,随着生育政策的开放,我国剖宫产率相对较高,CSD的发生率逐年增长。降低剖宫产率是预防CSD的根本措施,对于有再生育需求的患者,首次分娩时应严格遵循剖宫产手术指征;剖宫产时合理选择切口位置,注意缝合的松紧度,提升术者操作能力;缝合切口时避免穿透子宫内层,降低术后感染及内膜异位的风险。手术治疗是有再生育需求的CSD患者的首选治疗方式,手术具体方式需考虑RMT数值、年龄及医师能力等多种因素,综合评估为患者制定最优治疗方案。瘢痕处子宫肌层愈合的情况决定了再次妊娠的分娩结局,临床医生掌握剖宫产术后阴道分娩的指征至关重要。

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[参考文献]

- [1] ARMSTRONG F, MULLIGAN K, DERMOTT R M, et al. Cesarean scar niche: an evolving concern in clinical practice[J]. *Int J Gynecol Obstet*, 2023, 161(2): 356-366
- [2] STEGWEE S I, VAN DER VOET L F, HEYMANS M W, et al. Prognostic model on niche development after a first caesarean section: development and internal validation[J]. *Eur J Obstet Gynecol Reprod Biol*, 2023, 283: 59-67
- [3] STEGWEE S I, VERBERKT C, HUIRNE J A F. Letter on Genovese et al.'s "Impact of hysterotomy closure technique on subsequent cesarean scar defects formation: a systematic review" [J]. *Gynecol Obstet Invest*, 2023, 88(5): 322-324
- [4] VACHON-MARCEAU C, DEMERS S, BUJOLD E, et al. Single versus double-layer uterine closure at cesarean: impact on lower uterine segment thickness at next pregnancy[J]. *Am J Obstet Gynecol*, 2017, 217(1): 65.e1-65.e5
- [5] VERVOORT A J M W, UITTENBOGAARD L B, HEHENKAMP W J K, et al. Why do niches develop in caesarean uterine scars? Hypotheses on the aetiology of niche development[J]. *Hum Reprod*, 2015, 30(12): 2695-2702
- [6] CECI O, CANTATORE C, SCIOSCIA M, et al. Ultrasonographic and hysteroscopic outcomes of uterine scar healing after cesarean section: comparison of two types of single-layer suture [J]. *J Obstet Gynaecol Res*, 2012, 38(11): 1302-1307
- [7] STEGWEE S I, VAN DER VOET L F, BEN A J, et al. Effect of single-versus double-layer uterine closure during caesarean section on postmenstrual spotting(2close): multicentre, double-blind, randomised controlled superiority trial[J]. *BJOG*, 2021, 128(5): 866-878
- [8] STEGWEE S I, JORDANS I P M, VAN DER VOET L F, et al. Uterine caesarean closure techniques affect ultrasound findings and maternal outcomes: a systematic review and meta-analysis[J]. *BJOG*, 2018, 125(9): 1097-1108
- [9] SHOLAPURKAR S L. Etiology of cesarean uterine scar defect (Niche): detailed critical analysis of hypotheses and prevention strategies and peritoneal closure debate[J]. *J Clin Med Res*, 2018, 10(3): 166-173
- [10] TSUJI S, NOBUTA Y, HANADA T, et al. Prevalence, definition, and etiology of cesarean scar defect and treatment of cesarean scar disorder: a narrative review [J]. *Reprod Med Biol*, 2023, 22(1): e12532
- [11] JORDANS I P M, DE LEEUW R A, STEGWEE S I, et al. Sonographic examination of uterine niche in non-pregnant women: a modified Delphi procedure [J]. *Ultrasound Obstet Gynecol*, 2019, 53(1): 107-115
- [12] 吴钟瑜, 李慧东, 张蕾. 剖宫产术后子宫切口瘢痕处憩室的阴道超声诊断[J]. *中华妇产科杂志*, 2008, 43(6): 452-453
- [12] WU Z Y, LI H D, ZHANG L. Vaginal ultrasound diagnosis of diverticula at the uterine incision scar after cesarean section [J]. *Chinese Journal of Obstetrics and Gynecology*, 2008, 43(6): 452-453
- [13] 刘鸽. 不同月经模式子宫瘢痕憩室患者三维超声参数差异的研究[J]. *实用妇产科杂志*, 2023, 39(8): 636-638
- [13] LIU G. Study on the difference of three-dimensional ultrasound parameters in patients with uterine cicatricial diverticulum with different menstrual patterns [J]. *Journal of Practical Obstetrics and Gynecology*, 2023, 39(8): 636-638
- [14] BUDNY-WINSKA J, POMORSKI M. Uterine niche after cesarean section: a review of diagnostic methods [J]. *Ginekol Pol*, 2021, 92(10): 726-730
- [15] CHEN H, WANG Y, ZHANG H, et al. Vaginal repair of cesarean section scar defects: preoperative hysteroscopic evaluation [J]. *Acta Obstet Gynecol Scand*, 2022, 101(11): 1308-1314
- [16] KLEIN MEULEMAN S J M, MURJI A, VAN DEN BOSCH T, et al. Definition and criteria for diagnosing cesarean scar disorder [J]. *JAMA Network Open*, 2023, 6(3): e235321
- [17] MOHR-SASSON A, DADON T, BRANDT A, et al. The association between uterine scar defect(niche)and the presence of symptoms [J]. *Reprod Biomed Online*, 2023, 47(2): 103221
- [18] AL-GHOTANI B, MARTINI N, ALABDALLAH E, et al. A large post-caesarean Niche (Isthmocele) with amenorrhea, a symptom that was not reported in the medical literature: a rare case report [J]. *Int J Surg Case Rep*, 2023, 109: 108528
- [19] HUIRNE J A F, TWISK J W R, LAMBALK C B, et al. Reduced pregnancy and live birth rates after *in vitro* fertilization in women with previous Caesarean section: a retrospective cohort study [J]. *Hum Reprod*, 2020, 35(3): 595-604
- [20] WANG L, WANG J, LU N, et al. Pregnancy and perinatal outcomes of patients with prior cesarean section after a single embryo transfer in IVF/ICSI: a retrospective cohort

- study[J]. *Front Endocrinol (Lausanne)*, 2022, 13: 851213
- [21] 中华医学会儿科学分会. 剖宫产术后子宫瘢痕憩室诊治专家共识[J]. *中华妇产科杂志*, 2019, 54(3): 145-148
- Chinese Medical Association Family Planning Branch. Expert consensus on the diagnosis and management of uterine scar diverticulum after cesarean section[J]. *Chin J Obstet Gynecol*, 2019, 54(3): 145-148
- [22] YANG X, PAN X, CAI M, et al. Microbial flora changes in cesarean section uterus and its possible correlation with inflammation[J]. *Front Med*, 2021, 8: 651938
- [23] HUANG J, LIU X, HOU Y, et al. Macrophage polarisation in caesarean scar diverticulum[J]. *J Clin Pathol*, 2023, 76(6): 379-383
- [24] YANG X, PAN X, LI M, et al. Interaction between cervical microbiota and host gene regulation in caesarean section scar diverticulum[J]. *Microbiol Spectr*, 2022, 10(4): e0167622
- [25] LI Z, BIAN X, MA Y, et al. Uterine scarring leads to adverse pregnant consequences by impairing the endometrium response to steroids [J]. *Endocrinology*, 2020, 161(11): bqaa174
- [26] NOBUTA Y, TSUJI S, KITAZAWA J, et al. Decreased fertility in women with cesarean scar syndrome is associated with chronic inflammation in the uterine cavity [J]. *Tohoku J Exp Med*, 2022, 258(3): 237-242
- [27] PIRIYEV E, SCHIERMEIER S, RÖMER T. Laparoscopic isthmocele (Niche) correction as prevention in patients with fertility desire[J]. *Ginekol Pol*, 2022, 93(12): 954-961
- [28] AHAMED F M, SOLKAR S, STEVIKOVA M, et al. Link between cesarean section scar defect and secondary infertility: Case reports and review [J]. *JBRA Assist Reprod*, 2023, 27(1): 134-141
- [29] LAWRENZ B, MELADO L, GARRIDO N, et al. Isthmocele and ovarian stimulation for IVF: considerations for a reproductive medicine specialist[J]. *Hum Reprod*, 2020, 35(1): 89-99
- [30] STEGWEE S I, HEHENKAMP W J K, DE LEEUW R A, et al. Improved health-related quality of life in the first year after laparoscopic niche resection: a prospective cohort study[J]. *Eur J Obstet Gynecol Reprod Biol*, 2020, 245: 174-180
- [31] 梁晓璐, 洪丽美. 子宫憩室的中西医治疗进展[J]. *中外医学研究*, 2020, 18(2): 183-185
- LIANG X L, HONG L M. Progress in the treatment of previous cesarean scar defect with traditional chin and western med [J]. *Chinese and Foreign Medical Research*, 2020, 18(2): 183-185
- [32] VISSERS J, HEHENKAMP W J K, BRÖLMANN H A M, et al. Reproductive outcomes after laparoscopic resection of symptomatic niches in uterine cesarean scars: long-term follow-up on the prospective LAPNICHE study [J]. *Acta Obstet Gynecol Scand*, 2023, 102(12): 1643-1652
- [33] ABDOU A M, AMMAR I M M. Role of hysteroscopic repair of cesarean scar defect in women with secondary infertility [J]. *Middle East Fertility Society Journal*, 2018, 23(4): 505-509
- [34] YANG G, WANG J, CHANG Y, et al. Comparison of clinical effectiveness and subsequent fertility between hysteroscopic resection and vaginal repair in patients with cesarean scar defect: a prospective observational study [J]. *Reprod Biol Endocrinol*, 2023, 21(1): 119
- [35] TSUJI S, KIMURA F, YAMANAKA A, et al. Impact of hysteroscopic surgery for isthmocele associated with cesarean scar syndrome [J]. *J Obstet Gynaecol Res*, 2018, 44(1): 43-48
- [36] VERVOORT A, VISSERS J, HEHENKAMP W J K, et al. The effect of laparoscopic resection of large niches in the uterine caesarean scar on symptoms, ultrasound findings and quality of life: a prospective cohort study [J]. *BJOG*, 2018, 125(3): 317-325
- [37] DONNEZ O, DONNEZ J, ORELLANA R, et al. Gynecological and obstetrical outcomes after laparoscopic repair of a cesarean scar defect in a series of 38 women [J]. *Fertil Steril*, 2017, 107(1): 289-296.e2
- [38] TSUJI S, NOBUTA Y, YONEOKA Y, et al. Indication criteria of hysteroscopic surgery for secondary infertility due to symptomatic cesarean scar defect based on clinical outcomes: a retrospective cohort study [J]. *J Minim Invasive Gynecol*, 2023, 30(7): 576-581
- [39] ZOU Z, XIAO S, XUE M. Clinical analysis of the preoperative condition and operative prognosis of post-cesarean section scar diverticulum: a case series [J]. *J Perinat Med*, 2020, 48(8): 803-810
- [40] 冰清. 宫腹腔镜下折叠缝合术联合圆韧带缩短术治疗剖宫产子宫切口瘢痕憩室的疗效观察 [J]. *医学理论与实践*, 2021, 34(13): 2198-2200
- BING Q. Clinicalefficacy of laparoscopic folding suture combined with round ligaments shortening in treating diverticulum incision in cesarean section [J]. *The Journal of Medical Theory and Practice*, 2021, 34(13): 2198-2200
- [41] 吕春秀, 赵淑霞. 宫腔镜子宫瘢痕憩室下缘电切开渠术治疗剖宫产术后子宫瘢痕憩室所致经期延长的有效性 [J]. *医学理论与实践*, 2024, 37(9): 1530-1532
- LV C X, ZHAO S X. Effectiveness of hysteroscopic electrosurgical canalization of the lower margin of the uterine scar diverticulum in the treatment of prolonged menstua-

- tion due to uterine scar diverticulum [J]. *The Journal of Medical Theory and Practice*, 2024, 37(9): 1530-1532
- [42] 杨一君,董雯,刘晓平,等.腹腔镜折叠对接缝合联合宫腔镜憩室开渠法治疗剖宫产疤痕憩室的疗效[J]. *中华妇幼临床医学杂志(电子版)*, 2023, 19(3): 330-337
YANG Y J, DONG W, LIU X P, et al. Efficacy of laparoscopic folding suture combined with hysteroscopic diverticulum incision in the treatment of cesarean scar diverticulum [J]. *Chinese Journal of Obstetrics Gynecology and Pediatrics (Electronic Edition)*, 2023, 19(3): 330-337
- [43] 柯美莲,洪艺煌,许雅云,等.子宫疤痕缺损手术指征与手术方式的探讨[J]. *中国实用妇科与产科杂志*, 2023, 39(8): 837-841
KE M L, HONG Y H, XU Y Y, et al. Study on surgical indications and surgical methods of previous cesarean scar defect [J]. *Chinese Journal of Practical Gynecology and Obstetrics*, 2023, 39(8): 837-841
- [44] 刘云玥,张超,贺青文,等.经阴道疤痕憩室修补术治疗子宫疤痕憩室效果分析[J]. *中国妇幼保健*, 2024, 39(5): 777-780
LIU Y Y, ZHANG C, HE Q W, et al. Analysis of the effect of transvaginal scar diverticulum repair in the treatment of uterine scar diverticulum [J]. *Maternal and Child Health Care of China*, 2024, 39(5): 777-780
- [45] LV B, XIE X, LIU C, et al. Laparoscopic combined with hysteroscopic repair or operative hysteroscopy in the treatment of symptomatic cesarean-induced diverticulum [J]. *Med Sci*, 2018, 34(Focus issue F1): 47-51
- [46] YUAN Y, GAO J, WANG J, et al. A systematic review and meta-analysis of the efficacy and safety of hysteroscopic electric resection versus vaginal surgery in the treatment of uterine scar defects after cesarean section [J]. *Ann Transl Med*, 2022, 10(14): 786
- [47] GKEGKES I D, PSOMIADOU V, MINIS E, et al. Robot-assisted laparoscopic repair of cesarean scar defect: a systematic review of clinical evidence [J]. *J Robot Surg*, 2023, 17(3): 745-751
- [48] WALKER Z, GARGIULO A. Near-infrared and hysteroscopy-guided robotic excision of uterine isthmocele with laser fiber: a novel high-precision technique [J]. *Fertil Steril*, 2023, 120(5): 1081-1083
- [49] HUANG J, LI Q, YUAN X, et al. Intrauterine infusion of clinically graded human umbilical cord-derived mesenchymal stem cells for the treatment of poor healing after uterine injury: a phase I clinical trial [J]. *Stem Cell Res Ther*, 2022, 13(1): 85
- [50] 张国辉,施飞凤,方炜烨.探讨两种不同方式修补有生育要求的子宫疤痕憩室患者的临床疗效[J]. *中外医疗*, 2023, 42(35): 33-36
ZHANG G H, SHI F F, FANG W Y. Clinical efficacy of two different approaches to repairing cesarean scar diverticulum in patients with fertility requirements [J]. *China Foreign Medical Treatment*, 2023, 42(35): 33-36
- [51] SHAPIRA M, MASHIACH R, MELLER N, et al. Clinical success rate of extensive hysteroscopic cesarean scar defect excision and correlation to histologic findings [J]. *J Minim Invasive Gynecol*, 2020, 27(1): 129-134
- [52] SEN S, MALIK S, SALHAN S. Ultrasonographic evaluation of lower uterine segment thickness in patients of previous cesarean section [J]. *Int J Gynecol Obstet*, 2004, 87(3): 215-219
- [53] 胡慧颖,丁永霞.瘢痕子宫再妊娠孕妇产肌层厚度与不良妊娠结局关系[J]. *中国计划生育学杂志*, 2024, 32(2): 417-420
HU H Y, DING Y X. Correlation between the muscular layer thickness of pregnant women with scarred uterus and their adverse pregnancy outcomes [J]. *Chinese Journal of Family Planning*, 2024, 32(2): 417-420
- [54] 孟师慧,冯力民.剖宫产疤痕憩室对再次妊娠的影响及手术时机选择[J]. *中国实用妇科与产科杂志*, 2018, 34(8): 861-865
MENG S H, FENG L M. Timing of subsequent pregnancy and operation of cesarean scar diverticulum [J]. *Chinese Journal of Practical Gynecology and Obstetrics*, 2018, 34(8): 861-865
- [55] 白晶,王倩,毛萌,等.基于发病机制及病理变化治疗剖宫产疤痕缺损新术式疗效分析[J]. *中国实用妇科与产科杂志*, 2023, 39(6): 652-655
BAI J, WANG Q, MAO M, et al. Efficacy analysis of a new surgical method for cesarean scar defect based on pathogenesis and pathological changes [J]. *Chin J Practical Gynecol Obstet*, 2023, 39(6): 652-655
- [56] 林萍萍,樊佳宁,陆倩倩,等.43例子宫破裂的临床分析[J]. *南京医科大学学报(自然科学版)*, 2024, 44(6): 788-796
LIN P P, FAN J N, LU Q Q, et al. Clinical analysis of 43 cases of maternal uterine rupture [J]. *Journal of Nanjing Medical University (Natural Sciences)*, 2024, 44(6): 788-796
- [57] 白伶俐,梁亚慧,任永变.剖宫产术后再次妊娠阴道分娩的研究进展[J]. *实用妇科内分泌电子杂志*, 2021, 8(24): 26-28
BAI L L, LIANG Y H, REN Y B. Research progress of vaginal birth after cesarean section [J]. *Electronic Journal of Practical Gynecological Endocrinology*, 2021, 8(24): 26-28

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