

## ·综述 General review·

## 门静脉系统血栓:从病因到治疗的研究进展

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**【摘要】** 随着影像诊断技术的进步,曾被认为是罕见病的门静脉系统血栓的确诊率迅速上升。全身因素(包括各种促血栓形成的危险因素)以及局部因素(包括肝硬化、腹腔创伤及感染、恶性肿瘤等)均可导致门静脉血栓形成。目前依据临床症状出现时间的长短以及是否存在门脉海绵样变将门静脉系统血栓分为急性和慢性两类,这两类门静脉系统血栓分别具有不同的临床表现及治疗原则。急性血栓的治疗原则为复通闭塞的门静脉,降低血栓进入肠系膜上静脉的危险性;慢性血栓则为治疗和预防门脉高压后产生的并发症。门静脉系统血栓的介入治疗在血管再通、减轻门脉高压引起的并发症以及恢复阻塞静脉血流方面起到很大作用。本文将就门静脉系统血栓从病因到治疗的最新进展做一综述。

**【关键词】** 门静脉血栓;病因;临床表现;抗凝治疗;介入治疗

中图分类号:R735.7 文献标志码:A 文章编号:1008-794X(2015)-04-0362-07

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**【Abstract】** With the progress of imaging techniques, the diagnosis rate for portal vein thrombosis (PVT), that is used to be considered as a rare disease, has been rapidly increasing. PVT can be caused by systemic reasons such as various thrombophilic risk factors as well as a lot of local reasons such as cirrhosis, abdominal trauma and infection, malignant tumor, etc. At present, PVT is classified into acute and chronic entities based on the duration of clinical symptoms as well as on the presence or absence of portal cavernous transformation. The clinical manifestations and the treatment principles of the acute and chronic PVT are quite different. For acute PVT, the principle of treatment is to reopen the obstructed portal vein and to prevent the thrombus from entering into the superior mesenteric vein, while for chronic PVT the principle of treatment is focused on the management of the complications due to portal hypertension. The interventional management of portal thrombus plays an important role in reopening portal vein, reducing complications caused by portal hypertension, and restoring portal blood flow, etc. This paper aims to make a comprehensive review about the etiology and management of portal vein thrombosis. (J Intervent Radiol, 2015, 24: 362-368)

**【Key words】** portal vein thrombosis; etiology; clinical manifestation; anticoagulation therapy; interventional treatment

门静脉系统血栓是指血栓对门静脉、脾静脉和肠系膜上静脉管腔造成的完全或部分阻塞。以往门静脉系统血栓被认为是一种罕见病,随着诊断技术的发展,其确诊率正在不断提高,在肝硬化以及肝移植的患者中更高。全身和局部因素均可导致门静脉血栓形成,其中最常见的因素为肝硬化。传统将

门静脉系统血栓按照症状持续时间长短或是否伴有门静脉海绵样变分为急性和慢性两类。急性和慢性门静脉系统血栓具有不同的临床表现和治疗原则。我们将就门静脉系统血栓从病因到治疗的最新进展做一综述。

## 1 流行病学

以往认为,在普通人群中门静脉系统血栓非常罕见,故大多为个案或病例系列报道,缺乏大规模的流行病学研究<sup>[1-2]</sup>。Ogren 等<sup>[3]</sup>于 2006 年报道了

23 796 例瑞典人尸检结果,发现 254 例有门静脉血栓,患病率约为 1%,男女间无显著差别。在发展中国家由于腹腔感染发生率较高,门静脉血栓更为多见<sup>[4]</sup>。这些资料显示门静脉血栓并不罕见。在我国即使 65 岁以上老年人中有 1% 的患病率,人数也可能超过百万。造成罕见的原因可能是许多部分血栓或有较好侧支循环的患者不出现症状或仅有腹痛、腹胀等模糊症状<sup>[5-6]</sup>,对这些患者往往未做针对性的检查,从而导致漏诊。随着 CT、MRI 和超声技术在腹腔疾病诊断中的普及,门静脉血栓的确诊率也已逐步上升<sup>[7]</sup>。

肝硬化患者中门静脉血栓的患病率达 10%~20%,其比率随肝硬化严重程度而增加,在需做肝移植的患者中比率最高<sup>[4,8-9]</sup>。肝癌患者中门静脉血栓的患病率为 10%~44%<sup>[3,6,9-10]</sup>。患门脉高压的成年人中约 30% 伴有门静脉血栓,而儿童中该比率可高达 >75%<sup>[11]</sup>。此外,腹部感染、创伤和手术均可能增加门静脉系统血栓的发生率<sup>[12-14]</sup>。

## 2 病因

血管损伤、血流淤滞和血液高凝是导致静脉血栓的 3 个重要病理因素,这些因素可单独或合并出现<sup>[15]</sup>。门静脉系统血栓可由局部和全身因素造成。局部因素占 70%,全身因素占 30%<sup>[16]</sup>。最常见的局部因素为肝硬化、腹腔脏器恶性肿瘤(肝和胰腺为多见)和肝移植<sup>[4,16]</sup>,其他包括腹腔感染(如胰腺炎、胆囊炎和阑尾炎等)、腹腔损伤和腹腔手术等<sup>[4,16-17]</sup>。引起门静脉血栓的常见手术有胆道手术、脾切除、胃切除、门-腔静脉分流和肝移植等<sup>[12-13,18-19]</sup>,还有相当一部分患者病因不明<sup>[4]</sup>。

全身因素包括各种促血栓形成的危险因素<sup>[5,16-17,20-23]</sup>。在这些因素中以骨髓增生性疾病和凝血因子 V Leiden 突变最为常见<sup>[16,22,24]</sup>。此外,凝血酶原基因突变和天然抗凝蛋白(蛋白 C,蛋白 S 和抗凝血酶 III)下降也是导致门静脉系统血栓形成的重要因素<sup>[25]</sup>。目前认为许多病因不明的患者与这些促血栓形成因素有关<sup>[26]</sup>。全身和局部因素有时合并存在,使门静脉系统血栓形成明显增加。如凝血酶原基因突变和天然抗凝蛋白下降常发生在伴有肝硬化的门静脉血栓患者中<sup>[16-17]</sup>。对有骨髓增生性疾病患者做脾切除也可使门静脉血栓的发生率增加<sup>[27]</sup>。门静脉系统血栓的常见病因见表 1。

表 1 门静脉系统血栓的病因

全身因素	局部因素
先天性	腹腔感染
凝血因子 V Leiden 突变	胰腺炎、憩室炎、胆囊炎、阑尾炎、
凝血酶原基因突变	溃疡穿孔、肝脓肿等
蛋白 C 缺陷症	腹腔创伤和手术
蛋白 S 缺陷症	各种腹部创伤、脾切除、胆道手术、
凝血酶 III 缺陷症	结肠切除、门腔静脉分流、肝移植等
获得性	肝硬化
骨髓增生性疾病	恶性肿瘤
抗磷脂综合征	肝细胞癌、胃癌、胰腺癌、胆道癌、
高同型半胱氨酸血症	淋巴瘤等
阵发性睡眠性血红蛋白尿症	淋巴瘤等
血红蛋白尿	淋巴瘤等
口服避孕药	特发性
怀孕	

## 3 临床症状和诊断

门静脉系统血栓分急性和慢性两类,但没有明确的时间限定。一般认为急性血栓的症状出现 < 60 d<sup>[28]</sup>,但这有时很难定义。区分急慢性血栓的简单方法是急性血栓无侧支血管和门静脉海绵样变,并且没有门脉高压症状,如脾肿大和食管静脉曲张<sup>[26]</sup>。

### 3.1 急性血栓

急性血栓有时仅有非特异性症状甚至没有症状<sup>[29-30]</sup>。最典型的是突然发作的剧烈腹痛,其他还包括恶心、发热和腹泻<sup>[24,29]</sup>。体检可发现脾肿大,而腹水常不明显<sup>[24]</sup>。症状的严重程度与血栓时间、程度、范围和部位有关。最严重的是肠系膜上静脉及其静脉弓完全血栓,可产生肠缺血和肠坏死<sup>[31]</sup>。但肠坏死非常罕见,在所有急性门静脉系统血栓患者中发生率不到 5%<sup>[24]</sup>。门静脉部分血栓产生的症状较轻。

除了有肝脏疾病,实验室检查一般无明显异常<sup>[24]</sup>。采用非侵袭性成像技术,如超声、CT 和 MRI,是诊断门静脉系统血栓最有效的方法<sup>[32-35]</sup>。超声可显示静脉管腔中的固体物和侧支血管(海绵样变性),彩色多普勒超声仪可确定血流方向<sup>[36]</sup>。但是,超声对诊断肠系膜上静脉血栓不甚理想,CT 和 MRI 则可清晰显示肠系膜上静脉血栓。因此,CT 和 MRI 诊断门静脉系统血栓的敏感性高于超声。

### 3.2 慢性血栓

如果血栓的静脉不能获得早期再通,将导致永久性闭塞。但往往可迅速(数日内)建立侧支血管网与阻塞上下端的开放静脉相交通<sup>[15,37]</sup>,约 3~5 周显示出门静脉海绵样变<sup>[38]</sup>。侧支血管主要由一些原有的静脉扩张而成,其血管阻力明显大于正常门静脉。因此,门静脉主干或肝内门静脉支阻塞可导致

门脉高压<sup>[29]</sup>。

慢性门静脉血栓以门脉高压征象为主。门脉高压可产生许多并发症,如胃食管静脉曲张、脾肿大、贫血和血小板减少等<sup>[26]</sup>。20%~40%患者可发生上消化道出血<sup>[6,39]</sup>。有些患者胆总管受扩张门静脉压迫而发生阻塞,从而产生门脉性胆管病。这些患者可以无症状,也可出现黄疸、腹痛或胆管炎<sup>[4,40]</sup>。腹水和肝性脑病不常见,除非患者患有肝脏疾病。其他并发症有血胸和肝肾综合征。在无肝硬化和恶性肿瘤的患者中慢性门静脉血栓可不出现症状<sup>[29]</sup>。

脾功能亢进患者可出现血常规变化。当有脾肿大和门脉高压时要注意是否存在骨髓增生性疾病<sup>[41]</sup>。肝功能检查一般正常,但凝血因子和抑制物的水平常有所下降,很可能与轻度肝功能受损有关<sup>[12,25]</sup>。大多数慢性门静脉血栓患者有脾肿大、血细胞降低,胃食管静脉曲张和门静脉海绵样变性。对每例门脉高压患者都需考虑慢性门静脉血栓的可能性<sup>[29]</sup>。多普勒超声和 CT 都很容易发现侧支静脉<sup>[42]</sup>。肝活检不仅能诊断肝硬化,还可排除阻塞性门静脉病和其他一些罕见疾病。目前典型的静脉曲张性出血在西方国家明显减少,但在发展中国家仍多见<sup>[29]</sup>。

## 4 治疗原则

除了潜在性疾病外,急性和慢性门静脉系统血栓具有不同的治疗原则。血液疾病的治疗在本文中不作详细讨论。

### 4.1 急性血栓

4.1.1 抗凝治疗 对急性门静脉系统血栓的治疗有 2 个目的:①复通闭塞的门静脉,避免发展为慢性血栓;②降低血栓进入肠系膜上静脉的危险性,避免引起肠坏死。已有确凿证据显示门静脉系统的急性血栓极少发生血管自行再通,而早期抗凝治疗可使许多患者的阻塞静脉获得完全或部分再通<sup>[7,30,43]</sup>。因此,所有急性门静脉系统血栓患者只要没有明确的禁忌证均应进行抗凝治疗<sup>[31,44-45]</sup>,这一点现已达成共识。抗凝治疗至少维持 3 个月,根据情况可延长到 6 个月,对患有易栓症(thrombophilia)患者可终身抗凝<sup>[24,30,44]</sup>。抗凝需尽早开始,其疗效随用药时间的推延逐步下降<sup>[4,43]</sup>。除了血管再通外,抗凝治疗的另一个作用是防止血栓的蔓延。血栓阻塞肠系膜上静脉可导致肠缺血坏死。一旦出现肠坏死,应立刻进行手术切除<sup>[31]</sup>。

4.1.2 经门静脉介入治疗 全身性抗凝治疗的血管再通率并不很高,但其优点是并发症少而轻。发

病早期(第 1 周)迅速抗凝可使血管再通达 70%左右,稍晚(第 2 周)给药血管再通仅 25%<sup>[4,43]</sup>,超过 6 个月给药疗效为零<sup>[46]</sup>。许多患者,尤其是非肝硬化-非恶性肿瘤患者,因早期症状不很明显,容易错过早期抗凝的时机。Plessier 等<sup>[46]</sup>报道,抗凝治疗后门静脉、脾静脉和肠系膜上静脉的 1 年再通率分别为 38%、61%和 54%。Hall 等<sup>[1]</sup>对 15 篇文献进行分析,发现 228 例完全性门静脉栓塞的患者经抗凝后有 38.3%达到门静脉完全再通,14%获部分再通。这些资料表示在相当一部分患者中抗凝治疗的效果并不佳。近年来越来越多临床医师对门静脉系统栓塞进行经门静脉介入治疗,包括介入性门体分流术、门脉内碎栓和溶栓<sup>[1,47]</sup>。常用进入门静脉途径包括经皮穿肝内门静脉和经颈内静脉门体分流术(TIPS)等途径<sup>[47-48]</sup>。对于抗凝治疗失败的患者可尝试经门静脉介入疗法。对急性门静脉系统栓塞采用静脉介入进行局部溶栓和碎栓已有许多成功的案例报道<sup>[48-54]</sup>。但这些技术如使用不当可带来较高的并发症和病死率<sup>[47,55-56]</sup>。

### 4.2 慢性血栓

4.2.1 消化道出血的预防和治疗 对慢性门静脉系统血栓患者主要是治疗和预防门脉高压产生的并发症。最重要的并发症是胃-食管或其他异位静脉(如十二指肠或直肠静脉)曲张破裂引起的消化道出血。约 50%慢性门静脉血栓患者在诊断时已发现静脉曲张征象<sup>[24]</sup>。随访发现,在非肝硬化非恶性肿瘤性门静脉血栓患者中约 30%发生消化道出血,而有肝硬化患者出血的发生率更高<sup>[14,39]</sup>。当静脉曲张超过 5 mm 时即应考虑预防出血<sup>[57]</sup>。 $\beta$ 受体阻滞剂和内镜曲张静脉套扎均是预防首次出血的有效手段<sup>[58]</sup>。没有证据显示哪种方法更适用于门静脉血栓患者,但用  $\beta$ 受体阻滞剂更为经济。因此, $\beta$ 受体阻滞剂应作为预防首次出血的方法;内镜套扎可用于不适合使用  $\beta$ 受体阻滞剂的患者。当预防措施失败或曲张静脉已破裂出血,内镜即成为主要的治疗方法。急性出血的治疗多偏向于内镜套扎,但也可用内镜硬化疗法<sup>[44]</sup>。当首次出血得到控制,即要考虑预防再次出血。对有门脉高压患者仍可采用  $\beta$ 受体阻滞剂和内镜套扎<sup>[59-60]</sup>。药物和内镜联合应用对预防复发性静脉曲张出血具有更好的效果<sup>[60]</sup>。当这些治疗均无效,对反复出血患者可做手术分流,多用远端脾-直肠静脉分流<sup>[61]</sup>。其缺点是有较高的再出血发生率、其他致病率和病死率<sup>[62]</sup>。

4.2.2 抗凝治疗 对慢性门静脉系统血栓是否用



抗凝治疗存在不同意见。有人认为高发的消化道出血是采用抗凝治疗的障碍,不到 30%的慢性门静脉血栓患者适用抗凝治疗<sup>[63]</sup>。但也有报道认为,对慢性门静脉血栓进行选择性的抗凝治疗可降低血栓复发的可能性,而且静脉曲张出血的危险不增加甚至降低,尤其对无肝硬化患者有较好的疗效和安全性<sup>[14,45,64]</sup>。Amitrano 等<sup>[65]</sup>对 28 例伴肝硬化的门静脉血栓患者用低分子量肝素进行抗凝治疗,发现 6 个月 33.3% 患者获得门静脉完全再通,50% 部分再通,没有患者因严重并发症而终止治疗。这些结果提示抗凝治疗对伴有肝硬化的门静脉血栓仍安全有效<sup>[65]</sup>。根据美国肝病研究学会(AASLD)发布的指南提议对无肝硬化并有永久性血栓危险的患者,如果没有明确禁忌证并且食管静脉曲张获得了适当的治疗,可考虑长期抗凝<sup>[4,42]</sup>,但支持该提议的证据不足。目前认为抗凝对治疗慢性门静脉血栓应进行个体化考虑。

**4.2.3 经门静脉介入治疗** 当前最为常用且有效的介入方法是经颈内静脉行肝内门-体静脉分流术(TIPS)。TIPS 用于慢性门静脉血栓的最初目的是防治门脉高压引起的并发症,常用于治疗急性上消化道出血和预防再出血<sup>[65]</sup>。在门静脉血栓患者体内建立门体分流道可为门脉系统提供一个低阻力的流出道,这样能有效降低门脉压力、显著改善门脉系统的血流淤滞状态。早期 TIPS 只是作为急性出血时药物和内镜治疗无效后的一种抢救措施,主要原因是 TIPS 可能引起较高的肝性脑病发生率和病死率<sup>[66]</sup>。Garcia-Pagan 等<sup>[67]</sup>通过随机对照试验发现,TIPS 对肝硬化引起的急性上消化道出血的止血效果明显优于药物和内镜套扎,失败率和病死率均明显降低。这表示 TIPS 完全可以用于早期治疗门脉高压引起的急性上消化道出血<sup>[67]</sup>。此外,TIPS 也用于对顽固性腹水的治疗<sup>[66]</sup>。

除了减轻门脉高压引起的并发症,恢复阻塞静脉血流是治疗门静脉系统血栓的另一个重要目的。由于肝内门静脉完全闭塞,门脉海绵样变或肝硬化导致的严重肝萎缩和肝裂增宽均可增加建立肝内门腔分流的难度,导致较高的手术失败率<sup>[66,68]</sup>。因此慢性门静脉血栓曾被列为 TIPS 治疗的相对禁忌证,只能对少数选择性患者进行尝试<sup>[24,29,66]</sup>。但近年来介入性分流技术取得了很大的进步,包括合理采用经皮穿肝辅助、经脾静脉联合 TIPS、传统与逆行 TIPS 及 DIPS 等<sup>[69]</sup>。有经验的操作者进行介入性分流术成功率几近 100%(>98%)<sup>[70]</sup>。同时这些介入性

分流术还有其他一系列优点<sup>[71-74]</sup>:①为在门静脉系统使用较大直径的球囊、鞘和血栓切割装置提供了安全的入路;②输药导管能精确置入栓塞静脉,使局部溶栓成为现实;③自膨式聚四氟乙烯(ePTFE)涂层支架的应用使支架长期通畅率得到明显提高。随着手术技术和支架设计的进步,TIPS 治疗慢性门静脉血栓的成功率也不断提高。目前 TIPS 用于治疗慢性门静脉血栓的可行性已得到肯定,即使对伴有海绵样变的门静脉血栓也有效<sup>[70-71,74-76]</sup>。我国专家在这一领域同样做出了重大贡献<sup>[71,77-82]</sup>。TIPS 对血栓的处理可采用球囊扩张、分流支架植入、血管内溶栓和碎栓等手段,使血流获得再通,以降低门脉高压并发症及血栓进入脾静脉和肠系膜上静脉的危险性<sup>[51,53,72-73,81-84]</sup>。贺辰龙等<sup>[85]</sup>对 21 例门静脉血栓患者实施经颈静脉途径门静脉内置管药物溶栓和(或)机械性碎栓抽吸清除血栓,并对残存狭窄进行球囊扩张及植入内支架,85.7% 患者获得门脉再通(18/21)。这些治疗方法可根据不同病情分别或联合应用,以期获得更好的疗效并降低并发症和病死率。

## 5 总结

门静脉系统血栓可由局部或全身因素造成,局部因素如肝硬化等在门静脉系统血栓形成中占重要位置,但是对于这些患者是否合并全身因素仍然有待进一步研究。目前将门静脉系统血栓按症状出现时间或是否伴有门脉海绵样变分为急性和慢性两类。然而症状出现的时间并不等同于血栓形成的时间,血栓形成(尤其是部分血栓)后较长一段时间内可能不出现症状。因此进一步研究如何对门静脉系统血栓进行合理分类以便相应提供依据显得至关重要。对于所有急性门静脉系统血栓形成的患者只要没有明确的禁忌证均需进行抗凝治疗,而慢性门静脉系统血栓的患者的抗凝治疗则应进行个体化考虑,尤其是合并肝硬化的患者。门静脉系统血栓的介入治疗在血管再通、减轻门脉高压引起的并发症以及恢复阻塞静脉血流方面起到很大作用,但由于目前尚缺乏广泛被接受的介入治疗 PVT 的指南,进一步前瞻性随机对照研究仍值得开展。

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(收稿日期:2014-06-23)

(本文编辑:李 欣)