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介入栓塞治疗内脏动脉瘤的临床研究*

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摘要 目的:探讨介入血管腔内栓塞治疗内脏动脉瘤的方法、疗效及安全性。**方法:**选择内脏动脉瘤患者 23 例,包括脾动脉瘤 13 例,肝动脉瘤 2 例,胃十二指肠动脉瘤 3 例,肠系膜上动脉瘤 4 例,肾动脉瘤 1 例。其中,9 例行远近端动脉栓塞术,4 例采用支架辅助弹簧圈瘤体内填塞,3 例采用弹簧圈瘤体内填塞加瘤体内注胶栓塞术,4 例行弹簧圈瘤体内栓塞术,2 例行分支动脉颗粒栓塞术,1 例行单纯注胶栓塞术。术后 1 月、3 月、6 月行超声、CTA 或血管造影复查,以后每年复查一次。**结果:**本组均成功行介入血管腔内栓塞治疗内脏动脉瘤,栓塞治疗后造影示动脉瘤体和/或载瘤动脉闭塞,动脉瘤体内无明显对比剂显影,脾动脉瘤栓塞患者有 3 例出现发热,脾区疼痛等脾梗塞症状,未见栓塞术相关严重并发症发生。4 例消化道出血患者出血均停止。术后随访 3~48 个月,未见动脉瘤破裂出血、动脉瘤复发或增大,支架置入者,支架内及分支动脉血流均保持通畅。**结论:**介入血管腔内栓塞是一种治疗内脏动脉瘤的简便、微创、安全有效的方法。

关键词: 内脏动脉瘤;介入治疗;栓塞术

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Clinical Research on Endovascular Embolization in the Treatment of Visceral Artery Aneurysms*

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ABSTRACT Objective: To evaluate the efficacy and safety of endovascular interventional techniques in the treatment of visceral artery aneurysms (VAA). **Methods:** Twenty-three patients with VAAs were enrolled in the study, including 13 cases of splenic artery aneurysms, 2 cases of hepatic artery aneurysms, 3 cases of gastroduodenal aneurysms, 4 cases of superior mesenteric artery aneurysms and 1 case of renal artery aneurysm. Parent artery embolization was used for 9 cases of VAAs, stent grafts plus coil embolization was used for 4 VAAs, coiling plus glue embolization was used for 3 cases of VAAs, coiling only was used for 4 cases of VAAs, branch artery embolization was used for 2 cases of VAAs and glue embolization only was used for 1 case of VAA. Ultrasound, CTA or DSA follow-up was performed 1M, 3M and 6M after operation and annually thereafter. **Results:** The technique success rate was 100%. After treatment, immediate angiography showed occlusion of aneurysm sac or/and parent artery without any contrast filling within aneurysm sac. Splenic infarction symptoms including fever and pain were brought about after obliterating splenic artery aneurysms in 3 patients. No serious complications were found. Alimentary tract hemorrhage in 4 patients ceased after operation. There was no rupture, recurrence or enlargement of aneurysm during a 3-48 months' follow-up. The cases with stent grafts demonstrated a patency of stent and parent artery. **Conclusion:** Endovascular interventional embolization was an invasive, simple, safe and effective method for VAAs.

Key words: Visceral artery aneurysm; Interventional treatment; Embolization

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前言

内脏动脉瘤(visceral artery aneurysm, VAA)是指腹主动脉所属的各内脏动脉及其分支产生的动脉瘤,在临床上较为少见,病因主要包括动脉粥样硬化、动脉管壁中膜变性、肌纤维发育不良、先天性异常、外伤、医源性损伤、感染、结节性动脉炎、

坏死性血管炎、门静脉高压等^[1,2]。内脏动脉瘤以往的治疗以外科手术为主,随着介入放射学的发展,血管内介入治疗被应用于 VAA,并取得了令人满意的临床疗效。本文总结了我科 2008 年以来应用介入栓塞治疗的 23 例内脏动脉瘤患者的临床资料,现将结果报告如下。

1 资料和方法

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1.1 一般资料

选择我科 2008 年以来收治的 23 例 VAA 患者,男 10 例,女 13 例,年龄 40~83 岁,平均年龄 59.5 岁。按动脉瘤部位分脾动脉瘤 13 例(其中 1 例为迷走脾动脉瘤),肝动脉瘤 2 例,胃十二指肠动脉瘤 3 例,肠系膜上动脉瘤 4 例,肾动脉瘤 1 例。按动脉瘤瘤壁类型分真性动脉瘤 13 例,假性动脉瘤 7 例,夹层动脉瘤 3 例。13 例真性动脉瘤中,8 例无明显症状,在超声和 CT 检查中发现;5 例伴有上腹部隐痛不适。7 例假性动脉瘤中,2 例肝动脉假性动脉瘤为外科手术后,其中 1 例动脉瘤位于肝固有动脉,患者有腹痛不适,1 例位于肝右动脉,患者有消化道出血(胆道出血);3 例胃十二指肠动脉假性动脉瘤为外科手术后,患者有消化道出血;2 例脾动脉假性动脉瘤患者有慢性胰腺炎史。肠系膜上动脉瘤中 3 例为夹层动脉瘤,患者有突发腹痛。本组大部分病例术前经超声、CT 明确诊断。

1.2 治疗方法

1.2.1 血管造影 介入治疗途径均经股动脉穿刺,插入 4FCobra 导管或 RH 导管,将导管头端分别置入腹腔动脉或肠系膜上动脉或肾动脉开口处,注入对比剂行造影检查,证实是真性或假性或夹层动脉瘤的诊断,并进一步明确载瘤动脉的直径及迂曲情况、载瘤动脉远端的分支动脉情况、动脉瘤的部位和大小、动脉瘤瘤颈的位置及宽度等。根据具体造影情况选择合适的治疗方法。

1.2.2 载瘤动脉远近端栓塞 9 例内脏动脉瘤采用载瘤动脉远近端栓塞术。超选择性的将导管或微导管在导丝的引导下插至动脉瘤远端载瘤动脉主干,根据远端动脉直径推送入合适的弹簧圈(0.035in 或 0.018in, Cook)数枚,远端栓塞满意后后撤导管或微导管至动脉瘤近端载瘤动脉主干内,根据近端载瘤动脉直径再次推送入合适的弹簧圈数枚,必要时适量补充明胶海绵颗粒直至造影近端载瘤动脉主干完全闭塞,动脉瘤腔内无对比剂显影。

1.2.3 支架辅助弹簧圈瘤体内填塞 4 例内脏动脉瘤采用支架辅助弹簧圈瘤体内填塞术。血管造影完成后行全身肝素化,利用交换导丝将 8F 导引导管头端置入载瘤动脉主干内,经导引导管送入微导管,微导管头端进入动脉瘤腔内,经微导管于动脉瘤腔内填塞入可解脱弹簧圈,再植入自膨支架置于载瘤动脉瘤段,支架完全覆盖动脉瘤颈或夹层、并固定弹簧圈,最

后解脱弹簧圈,经微导管再于动脉瘤腔内可填塞入可解脱弹簧圈数枚,直至造影复查动脉瘤腔对比剂基本不显影。

1.2.4 弹簧圈瘤体内填塞加瘤体内注胶栓塞术 3 例内脏动脉瘤采用弹簧圈瘤体内填塞加瘤体内注胶栓塞术。利用交换导丝将 6F 导引导管头端置入载瘤动脉主干内,再经导引导管送入微导管,微导管头端进入动脉瘤腔内,经微导管于动脉瘤腔内填塞入可解脱弹簧圈数枚,之后经微导管予注入 Glubran-2 胶 + 超液态碘油乳化液(两者按 1:2~1:4 比例配制)进行瘤体内注胶栓塞直至造影复查动脉瘤腔对比剂基本不显影。

1.2.5 其他栓塞技术 4 例内脏动脉瘤行弹簧圈瘤体内填塞术,2 例行分支动脉颗粒栓塞术,1 例行单纯注胶栓塞术。弹簧圈瘤体内填塞术:利用交换导丝将 6F 导引导管头端置入载瘤动脉主干内,再经导引导管送入微导管,微导管头端进入动脉瘤腔内,经微导管于动脉瘤腔内填塞入可解脱弹簧圈数枚至造影复查动脉瘤腔对比剂基本不显影。分支动脉颗粒栓塞术:将微导管超选择插至远端分支动脉内,注入明胶海绵颗粒将分支动脉及分支动脉上的动脉瘤栓塞,至造影复查分支动脉动脉瘤段及动脉瘤对比剂不显影。单纯注胶栓塞术:将微导管插至载瘤动脉主干近动脉瘤处,注入 Glubran-2 胶 + 超液态碘油乳化液(两者按 1:2~1:4 比例配制)进行瘤体内及载瘤动脉远近端注胶栓塞直至造影复查载瘤动脉动脉瘤段及动脉瘤腔对比剂不显影。

1.2.6 术后处理及随访 术后观察临床症状缓解状况,有无并发症及发生情况。支架置入者术后常规行抗凝治疗(低分子肝素钙 4100 单位,皮下注射,1 次/12 小时)3 天,抗血小板治疗(氯吡格雷 75 mg+ 肠溶阿司匹林 100 mg,口服,1 次/日)6 个月。出院后 1、3、6 个月进行超声、CT 血管成像(CTA)或血管造影复查评估疗效,以后每年复查一次。

2 结果

本组病例均成功行介入血管腔内栓塞治疗内脏动脉瘤(图 1-8)。内脏动脉瘤部位、动脉瘤壁类型及治疗方法见表 1。

栓塞治疗后,造影示动脉瘤腔和 / 或载瘤动脉闭塞,动脉瘤腔内无明显对比剂显影。脾动脉瘤栓塞患者有 3 例出现发热,脾区疼痛等脾梗塞症状,经对症治疗后缓解,本组无脾脓肿发生。本组病例未见栓塞术相关严重并发症发生。4 例消化道

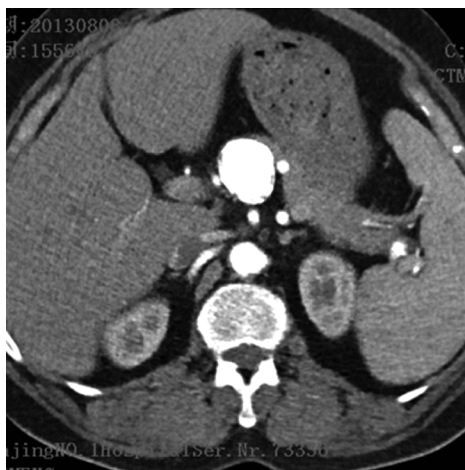


图 1 Fig.1



图 2 Fig.2



图 3 Fig.3



图 4 Fig.4

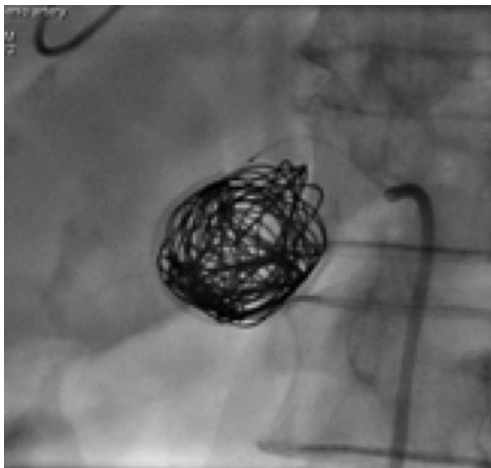


图 5 Fig.5

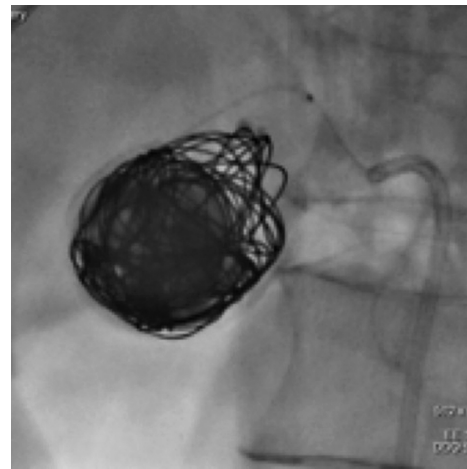


图 6 Fig.6



图 7 Fig.7

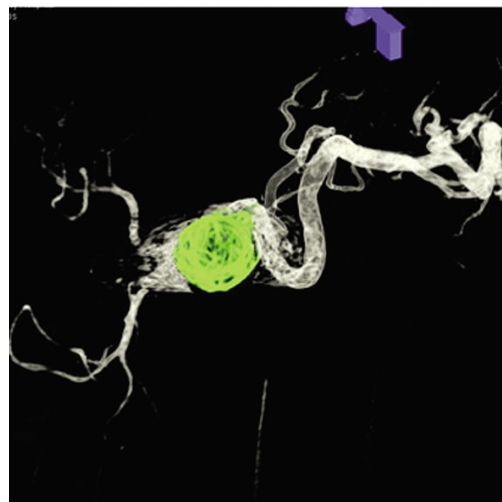


图 8 Fig.8

图 1-8 患者女性,55 岁,因 CT 发现脾动脉瘤入院。图 1:CT 增强扫描动脉期示脾动脉上见一 $32 \times 28\text{mm}$ 的动脉瘤。图 2:CTA 示脾动脉瘤位于脾动脉起始部。图 3:DSA 示脾动脉起始部动脉瘤。图 4:DSA 三维血管重建可清楚观察瘤体及瘤颈情况。图 5:微导管进入瘤腔,先行弹簧圈动脉瘤体内填塞成框架。图 6:经微导管瘤体内注入 Glubran-2 胶 + 超液态碘油乳液进行栓塞直至动脉瘤腔基本充填。图 7:栓塞治疗后造影示瘤腔完全填塞不显影,肝脾动脉主干通畅。图 8:栓塞治疗后造影 DSA 三维血管重建示动脉瘤腔无对比剂充填显影,载瘤动脉血流通畅。

Fig.1-8 Female, 55y, CT shows splenic aneurysm. Fig.1: CT enhanced scan shows splenic artery aneurysm ($32 \times 28\text{mm}$). Fig.2: CTA shows splenic aneurysm located at the initial part of splenic artery. Fig.3 DSA shows splenic aneurysm located at the initial part of splenic artery. Fig.4 3D-DSA shows the relationship of aneurysmal body and neck. Fig.5 Insert micro-catheter into the sac, and the coil was successfully positioned within the aneurysm for the formation of a proper coil basket. Fig.6 Glubran-2+iodine oil liquid was injected in aneurysm cavity. Fig.7 Angiography after the embolization therapy shows the aneurysm was completely embolization. The bloodflow in liver and splenic artery maintains patent. Fig.8 3D-DSA after embolization therapy shows the aneurysm was completely embolization. The bloodflow in the parent-artries maintains patent.

出血患者栓塞治疗术后消化道出血均停止。3 例肠系膜上动脉夹层动脉瘤患者术后 3 周内腹痛症状逐渐消失,恢复正常饮食。术后随访 3~48 个月,本组病例未见动脉瘤破裂出血、动脉瘤复发或增大。支架置入者,支架内及分支动脉血流均保持通畅。

表 1 23 例内脏动脉瘤部位、瘤壁类型及治疗方法

Table 1 The aneurysm location, type of aneurysm wall and treatment of 23 cases of VAAS

动脉瘤部位(病例数) Aneurysm location(No.)	动脉瘤壁类型(病例数) Type of aneurysm wall(No.)	治疗方法(病例数) Treatment (No.)
脾动脉瘤(13) Splenic artery aneurysm(13)	真性动脉瘤(11) True aneurysm (11)	载瘤动脉远端栓塞(6) Parent artery embolization (6)
		弹簧圈+ 注胶栓塞术(2) Coiling plus glue embolization (2)
		弹簧圈瘤体内填塞术(2) Coiling embolization (2)
		支架+ 弹簧圈填塞术(1) Stent grafts plus coil embolization(1)
		载瘤动脉远端栓塞(2) Parent artery embolization(2)
肝动脉瘤(2) Hepatic artery aneurysm(2)	假性动脉瘤(2) Pseudoaneurysm(2)	分支动脉颗粒栓塞术(1) Branch artery embolization(1)
		弹簧圈+ 注胶栓塞术(1) Parent artery embolization(1)
		分支动脉颗粒栓塞术(1) Branch artery embolization(1)
		载瘤动脉远端栓塞(1) Parent artery embolization(1)
		注胶栓塞术(1) Glue embolization(1)
胃十二指肠动脉瘤(3) Gastroduodenal aneurysm(3)	假性动脉瘤(3) Pseudoaneurysm(3)	弹簧圈瘤体内填塞术(1) Coiling embolization(1)
		支架+ 弹簧圈填塞术(3) Stent grafts plus coil embolization(3)
		弹簧圈瘤体内填塞术(1) Coiling embolization(1)
		载瘤动脉远端栓塞(1) Parent artery embolization(1)
		注胶栓塞术(1) Glue embolization(1)
肠系膜上动脉瘤(4) Superiormesenteric artery aneurysm(4)	真性动脉瘤(1) True aneurysm(1)	弹簧圈瘤体内填塞术(1) Coiling embolization(1)
		支架+ 弹簧圈填塞术(3) Stent grafts plus coil embolization(3)
		弹簧圈瘤体内填塞术(1) Coiling embolization(1)
		载瘤动脉远端栓塞(1) Parent artery embolization(1)
		注胶栓塞术(1) Glue embolization(1)
肾动脉瘤(1) Renal artery aneurysm(1)	真性动脉瘤(1) True aneurysm(1)	弹簧圈瘤体内填塞术(1) Coiling embolization(1)
		支架+ 弹簧圈填塞术(3) Stent grafts plus coil embolization(3)
		弹簧圈瘤体内填塞术(1) Coiling embolization(1)
		载瘤动脉远端栓塞(1) Parent artery embolization(1)
		注胶栓塞术(1) Glue embolization(1)

3 讨论

VAA 是一种严重威胁人类健康的血管疾病,其发生率约占人群的 0.1%-2%^[3],仅次于腹主动脉瘤和髂动脉瘤,在腹内动脉瘤中居第三位^[4]。在 VAA 中,按所占的比例依次为脾动脉瘤(60%),肝动脉瘤(20%),肠系膜上动脉瘤(5.5%),腹腔动脉瘤(4%),回结肠动脉(3%),胰十二指肠动脉瘤(2%),胃十二指肠动脉瘤(1.5%),肠系膜下动脉瘤 <1%^[5,6]。VAA 最大的危险在于动脉瘤的破裂出血,VAA 无破裂时总的死亡率为 8.5%,破裂后死亡率可高达 35~50%,假性动脉瘤破裂后死亡率接近 100%^[1]。

对于动脉瘤直径大于 2 cm、伴有症状、进行性增大的动脉瘤、怀孕和准备怀孕妇女的动脉瘤是需要进行干预治疗的^[7,8]。当内脏动脉瘤的直径达到 2 倍正常血管的直径,动脉瘤破裂的风险将会明显的增加,因而需要进行医疗干预^[9]。而对于假性动脉瘤来说,由于其具有较高的破裂风险,一旦诊断明确,不管动脉瘤的直径是多少,均需尽快的进行治疗,这个观点已成为共

识^[9,10]。内脏动脉瘤治疗的目的在于把动脉瘤从循环中隔绝,同时保持动脉瘤远端足够的器官血流量^[11]。传统治疗 VAA 的方法为外科手术,但外科手术的创伤大、对患者手术的耐受程度要求高,且手术有较高的死亡率。

随着介入放射学的发展,血管内介入治疗有逐步取代外科手术方法的趋势,对于外科治疗难度大、风险高或者存在手术治疗高危因素的内脏动脉瘤患者,应首先选择血管内介入治疗^[12-14]。血管内介入治疗方法包括经导管栓塞术和覆膜支架植入术^[15]。如果供血动脉血流阻断后其所供血的组织、器官不会出现梗塞的动脉瘤,可采用经导管栓塞术的治疗方法;对于必须保持供血动脉血流通畅的动脉瘤,可采用覆膜支架植入术或瘤体内填塞栓塞术的治疗方法。本组病例均采用经导管栓塞方法治疗内脏动脉瘤,取得了较好的临床疗效。

内脏动脉瘤的影像学检查对其确诊非常重要。近年来,随着 CT 与 MRI 影像技术的发展,此类病例的文献报道数量逐年增多,尤其是临床上对于一些急腹症患者进行早期的腹部多排

CT 增强扫描提高了其检出率^[6]。如能通过影像学的检查方法早期明确 VAA 的存在,特别是发现动脉瘤体直径大于 2 cm 且有增大趋势的 VAA,及时进行治疗,对降低 VAA 的死亡率具有积极的意义。腹部彩色多普勒超声检查方便、简捷、无创,可以动态观察瘤体内的血流动力学变化,可为临床选择治疗方案提供有价值的资料。CT 和 MRI 检查能客观地评价动脉瘤的位置、大小及与周围脏器的关系,CTA 通过三维重建成像,可清晰地提供动脉瘤的部位、形态、大小、瘤颈宽窄以及供血动脉情况等,可依据 CTA 来制定合理的治疗方案。本组 13 例真性动脉瘤中,8 例无明显症状在超声和 CT 检查中被发现,部分病例通过随访有增大,从而采取进一步的介入治疗。DSA 仍在 VAA 的诊断中占有重要地位,特别是在有不明原因的出血时行 DSA 检查的价值更大,DSA 不仅能明确动脉瘤部位、大小、出血来源,还可以同时进行栓塞治疗止血。本组有 4 例为消化道出血,直接行 DSA 检查,明确为内脏动脉瘤并通过介入栓塞方法治疗动脉瘤,栓塞治疗后出血均停止。

本组内脏动脉瘤采用经导管栓塞术的治疗方法包括载瘤动脉远近端栓塞、弹簧圈瘤体内填塞、支架辅助弹簧圈瘤体内填塞、弹簧圈瘤体内填塞加瘤体内注胶栓塞术、单纯注胶栓塞术及分支动脉颗粒栓塞术。载瘤动脉远近端栓塞即分别栓塞动脉瘤的远侧动脉和近侧动脉,使动脉瘤隔绝旷置,适用于动脉瘤位于载瘤动脉主干的中段,动脉瘤的远近侧载瘤动脉有足够的空间置入普通弹簧圈,远侧动脉供血的器官有较多侧支供血或有双重供血,远侧动脉分支闭塞后不会造成供血器官的缺血或严重后果的动脉瘤,如脾动脉瘤、肝动脉瘤、胃十二指肠动脉瘤等。本组有 8 例脾动脉瘤和 1 例胃十二指肠动脉瘤采用载瘤动脉远近端栓塞治疗,均达到了动脉瘤腔隔绝的目的。由于脾门侧存在胃短动脉、胃网膜左动脉等侧支血管,彻底栓塞脾动脉瘤的远近端动脉既能有效防止动脉瘤的破裂和复发,又不会造成大范围的脾脏梗死。本组脾动脉瘤栓塞治疗后有 3 例出现发热,脾区疼痛等脾梗塞症状,经对症治疗后缓解,无脾脓肿发生。经载瘤动脉远近端栓塞患者均未出现动脉瘤复发或增大及破裂出血等,提示应用远近端载瘤动脉栓塞治疗脾动脉中段的动脉瘤是安全、有效的方法。

对于位于主干动脉的开口部位或重要分支开口部位的内脏动脉瘤而言,则考虑用填塞法栓塞动脉瘤。本组有 11 例动脉瘤分别应用了弹簧圈瘤体内填塞、支架辅助弹簧圈瘤体内填塞、弹簧圈瘤体内填塞加瘤体内注胶栓塞术来栓塞动脉瘤腔。对于窄颈的动脉瘤,可采用弹簧圈瘤体内填塞或弹簧圈瘤体内填塞加瘤体内注胶栓塞术来栓塞动脉瘤腔,既栓塞了瘤腔,又保持了载瘤动脉血流通畅。本组有 4 例动脉瘤采取了弹簧圈瘤体内填塞,其中一例为迷走脾动脉瘤,脾动脉异位开口于肠系膜上动脉近端,动脉瘤位于脾动脉开口部,有学者应用弹簧圈栓塞动脉瘤远端脾动脉主干,再于肠系膜上动脉近段置入覆膜支架隔绝动脉瘤腔及脾动脉,而我们直接用可脱弹簧圈填塞动脉瘤腔,基本达到致密填塞,既栓塞了动脉瘤,又保持了肠系膜上动脉及脾动脉的主干通畅。而对于肝动脉和脾动脉的巨大动脉瘤,应用可脱弹簧圈填塞动脉瘤腔费用高,填塞效果有限,我们采取弹簧圈瘤体内填塞加瘤体内注胶栓塞术来栓塞动脉瘤

腔,先将成篮弹簧圈填入瘤体形成框架,再用栓塞剂(Glubran-2 胶 + 超液态碘油乳化液)将瘤体中残留的空间完全充填,这种所谓的 " 钢筋 + 混凝土 " 技术,利用弹簧圈成篮增加了胶的粘附性,使注入的胶可以停留在动脉瘤腔内,这样既能够保证载瘤动脉的通畅,又能够确保瘤体完全栓塞,通过形成钢筋混凝土样血栓使瘤体与载瘤动脉隔离,从而达到治愈动脉瘤的目的,同时也节约了患者的治疗费用。本组有 3 例采用了弹簧圈瘤体内填塞加瘤体内注胶栓塞术,取得了治愈动脉瘤的效果。而对于宽颈动脉瘤或夹层动脉瘤,则需要采用支架辅助弹簧圈瘤体内填塞的方法。国内有文献报道采用覆膜支架腔内隔绝术治疗肠系膜上动脉瘤^[17],也有学者采用多层裸支架技术对 VAA 进行修复,并取得满意效果^[18-20]。而本组则采用裸支架辅助弹簧圈瘤体内填塞的方法,运用支架覆盖瘤颈或夹层,可保护载瘤动脉,修复夹层,减轻狭窄,并使弹簧圈能很好地在动脉瘤内填塞,防止因载瘤动脉狭窄、闭塞造成远端分支缺血,并可以增加瘤颈栓塞致密度,由于有支架的阻挡,弹簧圈在瘤颈部可以依载瘤动脉形态塑型,完全覆盖动脉瘤颈,促进血栓化及愈合,而支架则可改变载瘤动脉及动脉瘤腔内血流动力学,促进动脉瘤腔内血栓形成,并刺激血管内皮生长,促进动脉瘤愈合。本组有 4 例采用支架辅助弹簧圈瘤体内填塞,均达到致密填塞效果,随访复查动脉瘤均愈合不显影,支架内及分支动脉血流均保持通畅。

对于远端分支动脉上的动脉瘤,可采用分支颗粒栓塞术。本组两例均为外科术后消化道大出血,急诊行 DSA 明确为分支动脉上的假性动脉瘤,将微导管超选择插至远端分支动脉内,注入明胶海绵颗粒将分支动脉及分支动脉上的假性动脉瘤栓塞,至造影复查分支动脉动脉瘤段及动脉瘤均不显影。通过栓塞治疗,两例患者消化道出血均停止,未再发生消化道出血。而对于吻合支区域的动脉瘤,可采用注胶栓塞术。本组 1 例为消化道大出血,急诊 DSA 示胃十二指肠动脉上胰十二指肠上下动脉吻合部假性动脉瘤,采用注胶栓塞术,将瘤体内及载瘤动脉远近端注胶栓塞直至造影复查载瘤动脉动脉瘤段及动脉瘤腔对比剂不显影。通过注胶栓塞治疗,该患者消化道出血停止,未再发生消化道出血。

综上所述,介入血管腔内栓塞是一种治疗内脏动脉瘤简便、微创、安全有效的治疗方法。有多种可供选择的栓塞治疗方法,而具体介入治疗方法的选择则应该根据动脉瘤的形态、部位、类型,载瘤动脉情况等综合考虑,进行合理的治疗方案选择。

参考文献(References)

- [1] Rossi M, Rebonato A, Greco L, et al. Endovascular Exclusion of Visceral Artery Aneurysms with Stent-Grafts: Technique and Long-Term Follow-up [J]. Cardiovasc Intervent Radiol, 2008, 31(1): 36-42
- [2] Uchiyama D, Koganemaru M, Abe T, et al. Coil Embolization of Splenic Artery Aneurysm with Preservation of the Parent Artery Using a Neck Remodeling Technique [J]. J Vasc Interv Radiol, 2007, 18(3): 447-450
- [3] Saltzberg SS, Maldonado TS, Lamparello PJ, et al. Is endovascular therapy the preferred treatment for all visceral artery aneurysms? [J].

- Ann Vasc Surg, 2005, 19(4): 507-515
- [4] Al-Habbal Y, Christophi C, Muralidharan V. Aneurysms of the splenic artery-a review[J]. Surgeon, 2010, 8(4): 223-231
- [5] Pasha SF, Gloviczki P, Stanson AW, et al. Splanchnic Artery Aneurysms [J]. Mayo Clinic Proceedings, 2007, 82(4): 472-479
- [6] Ruffino M, Rabbia C. Endovascular treatment of visceral artery aneurysms with Carditis multilayer flow modulator: preliminary results at six-month follow-up [J]. J Cardiovasc Surg, 2011, 52(3): 311-321
- [7] Guillon R, Garcier JM, Abergel A, et al. Management of Splenic Artery Aneurysms and False Aneurysms with Endovascular Treatment in 12 Patients[J]. Cardiovasc Intervent Radiol, 2003, 26(3): 256-260
- [8] 黄新天. 内脏动脉瘤常见病因及诊治 [J]. 中国实用外科杂志, 2009, 29(11): 894-896
Huang Xin-tian. Etiology and surgical treatment of splanchnic artery aneurysms [J]. Chinese Journal of Practical Surgery, 2009, 29(11): 894-896
- [9] Gabelmann A, Johannes G, Elmar MM, et al. Endovascular treatment of visceral artery aneurysms [J]. J Endovasc Ther, 2002, 9(1): 38-47
- [10] Aravind A, Mandeep D, Lawrence VH, et al. Treatment of splenic artery aneurysm with use of a stent-Graft [J]. J Vasc Interv Radiol, 2002, 13(6): 631-633
- [11] Etezadi V, Gandhi RT, Benenati JF, et al. Endovascular Treatment of Visceral and Renal Artery Aneurysms[J]. J Vasc Interv Radiol, 2011, 22(9): 1246-1253
- [12] Piffaretti G, Lomazzi C, Carrafiello G, et al. Visceral artery: management of 48 cases [J]. J Cardiovasc Surg, 2011, 52(4): 557-565
- [13] Marone EM, Mascia D, Kahlberg A, et al. Is open repair still the gold standard in visceral artery aneurysm management? [J]. Ann Vasc Surg, 2011, 25(7): 936-946
- [14] Balderi A, Antonietti A, Ferro L, et al. Endovascular treatment of visceral artery aneurysms and pseudoaneurysms: our experience [J]. Radiol Med, 2012, 117(5): 815-830
- [15] Fankhauser GT, Stone WM, Naidu SG, et al. The minimally invasive management of visceral artery aneurysms and pseudoaneurysms [J]. J Vasc Surg, 2011, 53(4): 966-970
- [16] Yun WS, Kim YW, Park KB, et al. Clinical and angiographic follow-up of spontaneous isolated superior mesenteric artery dissection[J]. Eur J Vasc Endovasc Surg, 2009, 37(5): 572-577
- [17] 路军良, 李京雨, 张强, 等. 腹腔内脏血管动脉瘤的介入治疗方法探讨[J]. 介入放射学杂志, 2009, 18(2): 90-92
Lu Jun-liang, Li Jing-yu, Zhang Qiang, et al. Interventional treatment of visceral aneurysms: an investigation of therapeutic technique [J]. J Intervent Radiol, 2009, 18(2): 90-92
- [18] Carrafiello G, Rivolta N, Annoni M, et al. Endovascular repair of a celiac trunk aneurysm with a new multilayer stent [J]. J Vasc Surg, 2011, 54(4): 1148-1150
- [19] Zhang L, Yin CP, Li HY, et al. Multiple overlapping bare stents for endovascular visceral aneurysm repair: a potential alternative endovascular strategy to multilayer stents [J]. Ann Vasc Surg, 2013, 27(5): 606-612
- [20] Ferrero E, Ferri M, Viazzo A, et al. Visceral artery aneurysms, an experience on 32 cases in a single center: treatment from surgery to multilayer stent[J]. Ann Vasc Surg, 2011, 25(7): 923-935

(上接第 7146 页)

- [13] Arnal B, Pernot M, Tanter M. Monitoring of thermal therapy based on shear modulus changes: II. Shear wave imaging of thermal lesions [J]. IEEE Trans Ultrason Ferroelectr Freq Control, 2011, 58(8): 1603-1611
- [14] Martí n A, Macé E, Boisdard R, et al. Imaging of perfusion, angiogenesis, and tissue elasticity after stroke [J]. J Cereb Blood Flow Metab, 2012, 32(8): 1496-1507
- [15] Youk JH, Son EJ, Park AY, et al. Shear-wave elastography for breast masses: local shear wave speed (m/sec) versus Young modulus (kPa) [J]. Ultrasonography, 2014, 33(1): 34-39
- [16] Zhou J, Zhan W, Chang C, et al. Breast lesions: evaluation with shear wave elastography, with special emphasis on the "stiff rim" sign [J]. Radiology, 2014, 272(1): 63-72
- [17] Kim YS, Park JG, Kim BS, et al. Diagnostic value of elastography using acoustic radiation force impulse imaging and strain ratio for breast tumors [J]. J Breast Cancer, 2014, 17(1): 76-82
- [18] Zhou J, Zhan W, Chang C, et al. Breast lesions: evaluation with shear wave elastography, with special emphasis on the "stiff rim" sign [J]. Radiology, 2014, 272(1): 63-72
- [19] Bouchard RR, Hsu SJ, Palmeri ML, et al. Acoustic radiation force-driven assessment of myocardial elasticity using the displacement ratio rate (DRR) method [J]. Ultrasound in Medicine and Biology, 2011, 37(7): 1087-1100
- [20] Brum J, Gennisson JL, Nguyen TM, et al. Application of 1-d transient elastography for the shear modulus assessment of thin-layered soft tissue: comparison with supersonic shear imaging technique [J]. IEEE Trans Ultrason Ferroelectr Freq Control, 2012, 59(4): 703-714