



doi:10.7659/j.issn.1005-6947.2020.06.008
http://dx.doi.org/10.7659/j.issn.1005-6947.2020.06.008
Chinese Journal of General Surgery, 2020, 29(6):686-692.

· 专题研究 ·

下肢深静脉顺行造影在下肢静脉曲张病因诊断中的应用价值

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摘要

背景与目的: 下肢静脉曲张是外周静脉病变的常见临床表现, 可由下肢静脉反流性疾病、下肢静脉回流障碍性疾病、静脉畸形等多种疾病所致; 不同病因导致的下肢静脉曲张其治疗原则也不尽相同。临床中常出现关于下肢静脉曲张的误诊误治, 故明确其病因至关重要。目前下肢静脉造影仍是诊断下肢静脉病变的金标准, 可提供完整的双下肢静脉系统影像, 为明确诊断及选择合适的治疗方案提供可靠依据。本研究总结江苏常州地区以下肢静脉曲张为主要临床症状的患者的下肢深静脉顺行造影结果, 探讨造影在下肢静脉曲张疾病中的意义, 并分析该地区引起下肢静脉曲张的主要病因。

方法: 使用数字减影血管造影(DSA)技术, 对苏州大学附属第三医院血管外科 2013 年 6 月—2019 年 3 月收治的 3 012 例(3 420 条肢体)下肢静脉曲张患者行下肢深静脉顺行造影, 观察患肢踝部至盆腔段深静脉形态、通畅度, 以及患者做 Valsalva 动作时造影剂的反流情况, 对患者静脉曲张的病因进行分析和分类。

结果: 3 420 条肢体中, 原发性下肢深静脉瓣膜功能不全 1 395 条(40.79%), 单纯浅静脉曲张 1 052 条(30.76%), 髂静脉受压综合征 569 条(16.64%), 下肢深静脉血栓后综合征 328 条(9.59%), 其他(双股静脉畸形、腘静脉瘤、深静脉瘤样扩张、先天性静脉曲张骨肥大综合征、布加综合征、盆腔肿瘤等) 76 条(2.22%)。

结论: 常州地区下肢静脉曲张患者的病因以下肢深静脉瓣膜功能不全、单纯浅静脉曲张及髂静脉受压为主。对于下肢静脉曲张病变, 需明确病因才能制定合理的治疗方案; 下肢深静脉顺行造影是明确下肢静脉曲张病因的可靠方法, 并能检出腘静脉瘤、布加综合征等少见疾病, 可有效避免误诊误治; 其在下肢静脉曲张病变中有重要的应用价值, 可作为下肢静脉曲张疾病的常规检查方法。

关键词

静脉曲张; 下肢; 静脉功能不全; 静脉造影术; 血管造影术, 数字减影

中图分类号: R543.6

Application value of deep vein anterograde venography in etiological diagnosis of lower limb varicose veins

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Abstract

Background and Aims: Varicose veins of the lower extremities are the common clinical manifestations of

基金项目: 国家自然科学基金资助项目(81700351)。

收稿日期: 2020-03-21; **修订日期:** 2020-05-16。

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peripheral venous diseases, which can be caused by variety of diseases such as venous reflux diseases, venous reflux disorders of the lower extremities, and venous malformations. The treatment principles of varicose veins caused by different etiologies are also different. Misdiagnosis and mistreatment of varicose veins of the lower extremities often occur in clinical practice, so it is very important to determine the pathogeny of varicose veins. At present, venography of the lower extremity is still the gold standard for the diagnosis of venous diseases of the lower extremity, which can provide a complete image of the lower extremity venous system, and provide a reliable basis for the clear diagnosis and selection of the appropriate treatment scheme. The purpose of this study was to summarize the results of antegrade venography of deep vein of lower extremity in Changzhou, Jiangsu Province, and to evaluate the significance of venography, and to analyze the main etiologies of varicose vein in this region.

Methods: From June 2013 to March 2019, 3 012 patients with varicose veins of the lower extremities (3 420 limbs) who were admitted to the Department of Vascular Surgery of the Third Affiliated Hospital of Suzhou University underwent antegrade venography with digital subtraction angiography (DSA). The morphology and patency of the deep veins from the ankle of the affected limb to segment in the pelvic cavity, as well as the reflow of the contrast material while the patient was performing the Valsalva maneuver were observed. Then, the etiologies of varicose vein of the patients were analyzed and classified.

Results: In the 3 420 limbs, there were 1 395 limbs with primary deep venous valve insufficiency (40.79%), 1 052 limbs with simple superficial varicose veins (30.76%), 569 limbs with iliac vein compression syndrome (16.64%), 328 limbs with post-thrombotic syndrome (9.59%), and 76 limbs (2.22%) with other pathogenies that included malformation of double femoral veins, popliteal venous aneurysm, deep venous aneurysm, Klippel-Trenaunay syndrome, Budd-Chiari syndrome and pelvic tumor.

Conclusion: The lower extremity varicose veins in patients in Changzhou region is mainly caused by deep venous insufficiency, simple superficial venous valve insufficiency and iliac vein compression. The proper treatment scheme for lower extremity varicose veins is based on the identification of pathogeny. Deep venography of lower extremities is a reliable method for distinguishing the etiologies of lower extremity varicose veins, which can determine the uncommon diseases such as popliteal venous aneurysm and Budd-Chiari syndrome, and thereby effectively avoid misdiagnosis and mistreatment. So, it is of great application value in peripheral venous diseases and can be used as a routine examination for peripheral venous diseases.

Key words Varicose Veins; Lower Extremity; Venous Insufficiency; Phlebography; Angiography; Digital Subtraction

CLC number: R543.6

下肢静脉曲张是下肢慢性静脉功能不全 (chronic venous insufficiency, CVI) 最常见的临床症状, 其发病率高达10%~30%, 易出现皮炎、下肢肿胀、静脉血栓形成、顽固性溃疡等并发症, 严重危害人类健康^[1-3]。然而, 下肢静脉曲张可由多种不同病因所致, 其治疗原则也不尽相同。由于仍存在对下肢静脉曲张发病原因鉴别不明的情况, 临床中常发生对下肢静脉曲张的误诊误治^[4]; 下肢静脉曲张行手术治疗后出现复发、下肢深静脉血栓形成等并发症也并不少见^[5-6]。随着医学发展, 人们对下肢静脉疾病有了更深的理解, 目前认为下肢深静脉顺行造影可以明确下肢静脉曲张的病因^[7-8], 对该类疾病的诊断和治疗有

重要意义。同时笔者查阅文献发现近年来关于下肢静脉曲张病因谱的研究较少。本研究收集苏州大学附属第三医院2013年6月—2019年3月收治的3 012例下肢静脉曲张患者资料, 统计共3 420条肢体的深静脉造影结果, 总结诊疗经验, 并分析在江苏常州地区引起下肢静脉曲张的主要病因。现将结果报告如下。

1 资料与方法

1.1 一般资料

本组共3 012例患者, 男1 976例 (65.6%), 女1 036例 (34.4%); 年龄20~82岁, 平均年

龄(53.8±12.2)岁;病程3个月至50年。本组共3 420条下肢均有下肢静脉曲张(100%),部分伴有下肢肿胀(69.2%)、皮肤色素沉着(58.2%)、湿疹(30.0%)、溃疡(4.7%)等。所有患肢均行下肢深静脉造影,其中左下肢2 295条(67.1%),右下肢1 125条(32.9%)。

1.2 造影参数

应用数字减影血管造影(digital subtraction angiography, DSA)技术,设备采用飞利浦数字平板血管造影机(Allura Xper FD-20)。造影剂使用欧乃派克(非离子碘造影剂)30 mL,用生理盐水稀释至50 mL。高压注射器设置注射速度1 mL/s,压力100 PSI(1 PSI=6.895 kPa)。

1.3 造影方法

患者平卧于检查床,穿刺足背静脉并连接高压注射器;予止血带分别在踝关节上方和大腿收肌管处阻断浅静脉。使用DSA的步进功能,分段观察患肢踝部至盆腔段深静脉。在观察大隐静脉汇入股静脉处时,嘱患者做Valsalva动作,若出现股静脉及大隐静脉血液倒流,则判定为下肢深静脉瓣膜功能不全;若仅发现大隐静脉血液倒流但不伴有股静脉倒流,则判定为单纯大隐静脉曲张。在观察盆腔部髂静脉时,术者挤压患者小腿腓肠肌或嘱患者行伸-屈踝动作,可使小腿静脉丛的造影剂快速回流,以增加髂静脉显影清晰度。若需进一步观察下腔静脉病变,则可穿刺股静脉置鞘造影。

2 结果

2.1 总体造影情况

本组3 420条下肢深静脉造影均顺利完成,未出现严重造影剂过敏等并发症。

2.2 静脉曲张病因分析结果

根据下肢深静脉的形态、通畅度、有无侧枝形成及Valsalva瓣膜功能试验等情况分析静脉曲张的病因。正常下肢深静脉形态与Valsalva试验情况见图1A。(1)原发性下肢深静脉瓣膜功能不全(primary deep venous valve insufficiency,

PDVI):共1 395条下肢,占总肢体数的40.79%,造影表现为:深静脉增粗,静脉瓣膜影模糊,外观呈直筒状,失去正常的“竹节状”形态;行Valsalva试验见造影剂自深静脉瓣膜处向远端反流,同时可见大隐静脉反流、显影(图1B)。(2)单纯浅静脉曲张:共1 052条下肢,占30.76%;其中大隐静脉曲张占85.2%,合并小隐静脉曲张者占14.8%。其造影征象为:行Valsalva试验时,造影剂自股静脉向大隐静脉反流,隐股交界处瓣膜影模糊不清,瓣膜窦结构破坏;而深静脉则无明显反流,可见静脉瓣,瓣窦对称膨出,呈“竹节样”形态(图1C)。(3)髂静脉受压综合征:共569条下肢,占16.64%。其造影表现为髂静脉汇入下腔静脉处狭窄,造影剂变淡,粗大的盆腔侧支静脉形成(图1D)。(4)下肢深静脉血栓后综合征(post-thrombotic syndrome, PTS):共328条下肢,占9.59%,多有下肢肿胀史(312条肢体,占95.1%),其造影征象为股腘静脉部分再通,管壁僵硬、毛糙,瓣膜影消失,周围见侧支循环形成,行Valsalva动作可使造影剂向深静脉远端、交通静脉及浅静脉逆流(图1E);而髂静脉可表现为长段闭塞,盆腔可见丰富的侧支血管形成(图1F)。(5)其他:共76条下肢,占2.22%。其中双股静脉畸形造影表现两条股静脉粗细相当(图1G),且多伴有静脉瓣膜功能不全;盆腔肿瘤压迫的造影征象为髂静脉局段受压、狭窄(图1H),进一步的盆腔CT检查可明确肿瘤位置;腘静脉瘤造影征象为腘静脉局段瘤样扩张,造影剂在瘤腔内形成涡流(图1I);下肢深静脉瘤样扩张则表现为股静脉长段的扭曲、扩张,伴病变部位瓣膜缺失,行Valsalva动作可见造影剂明显反流(图1J);先天性静脉曲张骨肥大综合征(Klippel-Trenaunay syndrome, KTS)造影表现为深静脉部分缺如及下肢后外侧浅静脉曲张、畸形(图1K);布加综合征下肢深静脉造影和浅静脉曲张类似^[9],但患者常伴有腹壁静脉曲张、肝功能异常等,需进一步行股静脉置管造影,可发现肝后下腔静脉狭窄或闭塞(图1L)。

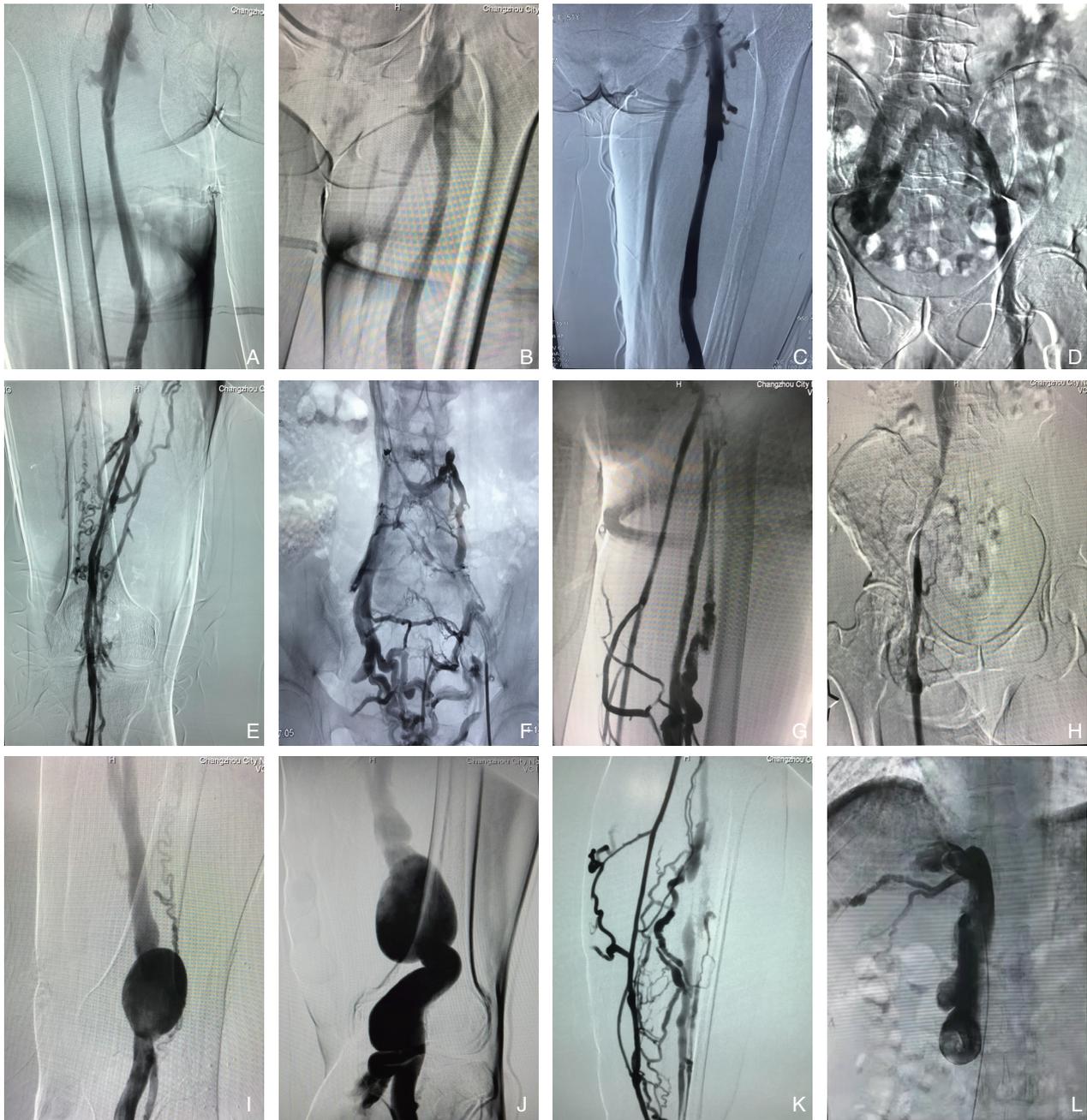


图 1 下肢深静脉造影图像 A: 正常下肢深静脉, 行 Valsalva 试验未见深静脉及大隐静脉造影剂反流; B: 原发性下肢深静脉瓣膜功能不全, 行 Valsalva 试验可见深静脉及大隐静脉造影剂反流; C: 单纯浅静脉曲张, 行 Valsalva 试验可见大隐静脉造影剂反流, 但无深静脉反流; D: 髂静脉受压综合征, 髂静脉汇入下腔静脉处狭窄, 周围见粗大侧支形成; E-F: 下肢深静脉血栓后综合征, 股静脉和髂静脉段造影见管壁毛糙, 瓣膜影消失, 大量侧支循环形成; G: 双股静脉畸形; H: 盆腔肿瘤压迫所致的髂静脉狭窄; I: 腘静脉瘤; J: 深静脉瘤样扩张; K: 先天性静脉曲张骨肥大综合征, 表现为深静脉部分缺如及下肢后外侧浅静脉曲张、畸形; L: 布加综合征, 行股静脉置管造影见肝后下腔静脉闭塞

Figure 1 Deep venography of lower extremity A: Normal deep vein of lower extremity, no presence of reflux of contrast medium during Valsalva test; B: Primary deep venous valve insufficiency, the venography showing reflux of both deep vein and great saphenous vein during performing Valsalva test; C: Simple superficial varicose veins, only the presence of reflux in the great saphenous and no reflux present in the deep veins during Valsalva test; D: Iliac vein compression syndrome, and presence of stenosis in the convergence of the iliac vein to the inferior vena cava, with formation of large collateral circulation; E-F: Post-thrombotic syndrome, segmental angiography of the femoral vein and iliac vein showing rough wall, disappearance of valve shadow and formation of a large number of collateral circulations; G: Bilateral bitruncular venous malformation; H: Iliac vein stenosis caused by pelvic tumor compression; I: Popliteal venous aneurysm; J: Dilatation of deep vein; K: Klippel-Trenaunay syndrome manifested as absence of deep vein and posterolateral varicose vein and deformity; L: Budd-Chiari syndrome, presence of occlusion of the inferior vena cava after femoral vein catheterization

3 讨论

下肢静脉曲张是慢性静脉功能不全的临床表现之一，其发病机制尚未完全阐明，目前认为静脉高压是静脉曲张发生、发展的病理基础^[10-11]。下肢静脉倒流性疾病和下肢静脉回流障碍性疾病均能引起静脉高压，进而形成下肢浅静脉曲张、下肢水肿、小腿皮肤色素沉着及湿疹等类似的临床症状^[12]；由于这两类疾病的治疗原则不尽相同，故鉴别下肢静脉曲张的病因尤为重要。

目前仪器检查主要通过彩色多普勒超声、数字胃肠机或DSA下肢深静脉造影来明确静脉曲张的病因^[13-15]。由于受患者体型、下肢肿胀、血管变异及操作者水平差异等影响，彩超的敏感性较低^[16]；数字胃肠机造影则受骨骼及血管重叠的干扰，造影图片（尤其是髂静脉段）往往不够清晰^[17]。而DSA造影可清晰观察从足踝至髂静脉、甚至下腔静脉的全貌，通过本组病例，笔者总结DSA造影以下优点：(1) 造影过程中可以选择不同角度，能清楚观察血管形态，且其图像清晰度明显高于X线图像，避免了传统的股静脉或腘静脉穿刺造影，减少了创伤；(2) 可根据需要选择是否减影，并能动态回放造影过程，以更好地观察病变血管；(3) 可以清楚观察髂静脉病变及盆腔侧支情况，这是诊断髂静脉受压综合征及PTS最简便且可靠的方法；(4) 与数字胃肠机相比，DSA可减少造影剂用量，同时DSA的步进功能也减少了操作者在X线中的暴露时间。当然，与胃肠机相比，DSA也存在一些缺点，比如造影过程中不能通过调整患者体位来观察静脉反流情况。因此，在DSA造影过程中患者行Valsalva动作时，建议同时按压患者下腹部，通过增加腹内压来更清楚地观察血液反流

情况，以更准确地判断深静脉瓣膜的功能状态。

本研究对江苏省常州地区下肢静脉曲张患者行顺行深静脉造影，发现本地区引起下肢静脉曲张的病因依次为：原发性下肢深静脉瓣膜功能不全（40.79%），单纯浅静脉曲张（30.76%），髂静脉受压综合征（16.64%），下肢深静脉血栓后综合征（9.59%），其他（2.22%）。本组结果与王孝高等^[18]的研究结果相近，但与曾宏等^[19]及田卓平等^[20]的研究结果有较大差异，即下肢静脉曲张病因谱中髂静脉受压综合征的占比明显增高了（表1），这可能与近年来对该疾病的理解深度、诊断标准及重视程度相关^[21-23]。本组病例造影还发现了一些临床少见疾病，如双股静脉畸形、盆腔肿瘤压迫髂静脉、腘静脉瘤、下肢深静脉瘤样扩张、KTS、布加综合征等。根据不同病因所致的下肢静脉曲张，应选择相应的治疗方法。对于单纯浅静脉曲张，可选择大/小隐静脉高位结扎、曲张静脉点剥术；对于原发性下肢深静脉瓣膜功能不全，同样可采用大/小隐静脉高位结扎+曲张静脉点剥术，术后患肢长期穿弹力袜压力治疗，可取得良好的疗效，有研究^[24-25]表明对于伴有深静脉瓣膜功能不全的浅静脉曲张患者，单纯行浅静脉手术亦可改善深静脉瓣膜反流，并减轻下肢肿胀等相关症状。对于髂静脉受压综合征和下肢深静脉血栓后综合征，一般先行髂静脉球囊扩张+支架植入术，二期处理浅静脉曲张^[26-27]；腘静脉瘤有形成血栓、导致肺动脉栓塞可能，是一种有致死风险的疾病，可根据静脉瘤的形态行腘静脉瘤侧方缝合成形术、瘤体切除加静脉移植术及瘤体切除加端端吻合术等^[28-29]；而双股静脉畸形、盆腔肿瘤压迫髂静脉、下肢深静脉瘤样扩张、KTS等往往只需行对症的压力治疗即可^[30-31]。

表1 不同研究中的静脉曲张不同病因的比例（%）

Table 1 Proportion of different etiologies of varicose veins in different studies (%)

静脉曲张病因	本研究 (2013—2019年, 3 420 肢体)	王孝高, 等 ^[18] (2008—2012年, 2 814 肢体)	曾宏, 等 ^[19] (1999—2008年, 1 230 肢体)	田卓平, 等 ^[20] (1981—1998年, 7 908 肢体)
原发性下肢深静脉瓣膜功能不全	40.79	33.93	49.51	53.02
单纯浅静脉曲张	30.76	20.03	29.10	15.54
髂静脉受压综合征	16.64	25.77	0.32	0.14
下肢深静脉血栓后综合征	9.59%	9.79	15.93	26.83

清晰的造影结果为制定诊疗方案提供了可靠的影像学依据，从而对不同病因导致的静脉曲张提供合适的治疗方法，避免了手术的盲目和片

面，减少了误诊误治。DSA下肢深静脉顺行造影操作简便、安全可靠，是目前检测下肢静脉系统病变最佳的诊断方法，可作为下肢静脉曲张疾病

的常规检查方法。未来期望有更大样本量、多中心的相关研究,更好地分析下肢静脉曲张的病因谱,以加深对该类疾病的理解,最终达到提高治愈率的目的。

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(本文编辑 宋涛)

本文引用格式: 王鑫, 张博闻, 姜云飞, 等. 下肢深静脉顺行造影在下肢静脉曲张病因诊断中的应用价值[J]. 中国普通外科杂志, 2020, 29(6):686-692. doi:10.7659/j.issn.1005-6947.2020.06.008

Cite this article as: Wang X, Zhang BW, Jiang YF, et al. Application value of deep vein anterograde venography in etiological diagnosis of lower limb varicose veins[J]. Chin J Gen Surg, 2020, 29(6):686-692. doi:10.7659/j.issn.1005-6947.2020.06.008