·综　述　General review·

永存三叉动脉伴发脑血管性病变及其他脑部疾病

陈元畅，　李明华

【摘要】 永存三叉动脉(PPTA)是成人最常见的一种永久性颈内动脉和基底动脉之间的异常吻合，是一种较罕见的脑血管变异。PPTA 经常伴发脑血管性病变，并且可引起三叉神经痛，动眼神经、外展神经麻痹，蛛网膜下腔出血等症状，与临床关系较为密切。本文对 1983 年至今中英文文献报道的 116 例 PPTA 伴发脑血管性病变及其他脑部疾病的病例进行总结。

【关键词】 永存三叉动脉；脑血管性病变；脑部疾病

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Persistent primitive trigeminal artery associated with cerebrovascular diseases and other cerebrosis

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【Abstract】 Persistent primitive trigeminal artery (PPTA) is the most common permanent abnormal vascular anastomosis between carotid artery and basilar artery. PPTA is a rare cerebrovascular variation and is often associated with cerebrovascular disease (CVD). Clinically, PPTA manifests itself in symptoms such as trigeminal neuralgia, oculomotor paralysis, abducens nerve paralysis, subarachnoid hemorrhage, etc. This paper aims to review 116 PPTA cases with CVD and other cerebrosis, which have ever been reported since 1983 in English or Chinese medical literature. (J Intervent Radiol, 2009, 18: 314-316)

【Key words】 persistent primitive trigeminal artery; cerebrovascular disease; cerebrosis

永存三叉动脉 (persistent primitive trigeminal artery, PPTA)又名持续性三叉动脉或原始三叉动脉，是成人最常见的一种永久性颈内动脉(ICA)和基底动脉(BA)之间的异常吻合，是一种较罕见的脑血管变异。在成年人脑血管造影中发现率约为 0.02%～0.6%。文献报道 25%的 PPTA 患者伴有其他脑血管性病变[1]。

1　三叉动脉胚胎发育过程

在人类胚胎发育阶段，原始颈动脉与后循环之间有 4 支暂时性的通路，即原始三叉动脉、原始舌下动脉、原始内听动脉和原始寰前节间动脉。三叉动脉是胚胎颈动脉与成对的背侧纵神经动脉最头侧的暂时性胚胎性吻合血管，最早于胚胎期 3 mm 期发生于双主动脉与第 1 弓动脉的交汇处。当弓动脉退化，三叉动脉被兼并于颈内动脉系统，与纵行神经动脉交通并提供大部分血供。在胚胎 5～6 mm 期，后交通动脉(PcomA)开始发育，7～12 mm 期纵行神经动脉逐渐融合成基底动脉，于胚胎 11.5 mm 期颈内-椎基底间的胚胎性吻合开始消退，三叉动脉为其中最后萎缩和退化的。正常情况下，到胚胎 14 mm 期，胚胎性吻合均已退缩，其功能完全由后交通动脉和椎动脉所替代，如果胚胎性吻合不退缩并持续到成人，即成为永存颈内-椎基底吻合。其中 PPTA 最常见(占 85%～87%)，次之为永存舌下动脉及永存内听动脉[2]。

2　PPTA 的解剖特点

PPTA 一般起于颈内动脉海绵窦段，按走行分外侧型和内侧型 2 种，分别占 41%和 59%，但目前文献报道以外侧型为主[3]。外侧型多起自海绵窦段膝部后外侧壁，先位于动眼神经和滑车神经的下方，后位于三叉神经第 1 支和三叉神经感觉根内侧、蝶鞍外侧的硬膜外向后走行，经外展神经下方，拐向后内侧，在岩床韧带下与基底动脉吻合。内侧型起自 ICA 后内侧壁，经蝶鞍内硬膜外的三叉动脉沟内，穿过斜坡的硬膜与 BA 吻合[4]，见图 1。一些学者报道 PPTA 变异型(PPTAV)，是颈内动脉与小脑

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动脉的异常吻合。多起自 ICA 海绵窦前段或绵窦段，止于小脑上动脉(SCA)、小脑下前动脉(AICA)或小脑下后动脉(PICA)。

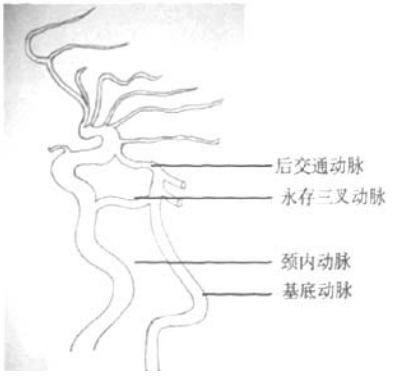


图 1 PPTA 示意图(侧位)

3 PPTA 伴发脑血管性病变及其他脑部疾病

多数 PPTA 的存在并不引起任何特殊临床症状，且有供血功能。但有约 25% PPTA 可合并其他脑血管病变[1]。与 PPTA 相关的脑血管病有动脉瘤、颈动脉海绵窦瘘、动静脉畸形、烟雾病、颈内动脉发育不良或闭塞和 Sturge-Weber 综合征等，短暂性脑缺血发作和后循环系统梗死的发生率也会增加。

根据 1983 年至今的中英文文献报道[5-28]，计有 135 例 PPTA 病例。单发 PPTA 19 例，包括 PPTA 12 例，PPTA 变异型 7 例。PPTA 伴发脑血管性病变及其他脑部疾病 116 例，包括 PPTA 107 例，PPTA 变异型 9 例，其中同时伴 2 种病变 28 例，2 种以上病变 2 例。PPTA 伴动脉瘤 47 例(31.76%)；伴烟雾病 12 例(8.11%)；伴动静脉畸形 20 例(13.51%)；伴颈动脉海绵窦瘘 20 例 (13.51%)；伴缺血性脑病 11 例(7.43%)(表 1)；伴脑血管变异 27 例(18.24%)，其中 6 例同时存在多种血管变异，共计 38 例(表 2)，包括基底动脉-椎动脉发育不良、缺如和开窗畸形，后交通动脉缺如和胚胎型大脑后动脉，大脑前动脉 A1 段发育不良、开窗畸形和奇大脑前动脉，大脑中动脉发育不良和开窗畸形，颈内动脉发育不全以及其他永存动脉等；伴发其他脑病，如海绵状血管瘤、Chiari I 型畸形、脑干功能障碍等 11 例(7.43%)。在 116 例 PPTA 中，发生部位于左侧 48 例，右侧 38 例，双侧 1 例，29 例未予描述；病变存在于 PPTA 同侧 81 例，PPTA 对侧 13 例，22 例未予描述；病变位于幕上 92 例，位于幕下 16 例，8 例未予描述；男 36 例，女 51 例，29 例未予描述；发病年龄 6 个月 ~ 82 岁，27 例未予描述。

表 1 110 例 PPTA 伴发脑血管性病变一览

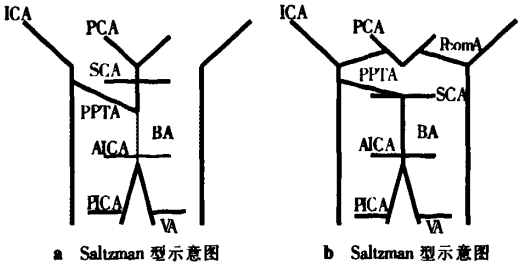
伴发疾病		总数
动脉瘤		
前循环	同侧	22
	对侧	3
	未提供	15
后循环	同侧	3
	对侧	1
未提供		3
小计		47
动静脉畸形		
幕上	同侧	11
	对侧	3
	未提供	1
幕下	同侧	3
	对侧	0
	未提供	1
未提供		1
小计		20
颈动脉海绵窦瘘		20
烟雾病		12
缺血性脑病		11
合计		110

表 2 38 例 PPTA 伴其他脑血管性变异一览表

变异	例数
基底动脉变异	6
椎动脉变异	13
后交通动脉变异	6
大脑前动脉变异	5
大脑中动脉变异	2
颈内动脉变异	4
永存内听动脉	2
合计	38

4 PPTA 循环特征

Saltzman[29]以影像学特征及其循环特征将PPTA分为 3 型，I 型：双侧小脑上动脉和大脑后动脉由 PPTA 供血，双侧后交通动脉发育不全或消失，位于 PPTA 吻合点下方基底动脉可发育不良；II 型：同侧大脑后动脉由后交通动脉供血，双侧小脑上动脉由 PPTA 供血(图 2)；III 型：I ~ II 型混合表现。以 I 型最多见。有些学者将 PPTAV 归入III型，并根据其止于 SCA，AICA 或 PICA 分为 a、b、c 3 个亚型[8]。本文具有 DSA 检查资料的 21 例病例中，Saltzman I 型 12 例，II 型 6 例，III 型 3 例(表 3)。



a Saltzman 型示意图 b Saltzman 型示意图

图 2 Saltzman 分型示意

表 3　21 例 PPTA 分型一览

型别	例数	PPTA部位			
		左侧	右侧	双侧	未提供
Saltzman Ⅰ型	12	5	3	1	3
Saltzman Ⅱ型	6	2	2		2
Saltzman Ⅲ型	3	2	1		0
合计	21	9	6	1	5

5　临床意义

PPTA 的临床意义存在争议。由于大多数的 PPTA 只是在尸解和血管造影中偶然发现，因此一些学者认为除了三叉动脉自身处于疾病过程中如动脉粥样硬化外，几乎没有证据支持 PPTA 和任何临床神经病学有关系。然而，鉴于有关三叉动脉引起三叉神经痛，动眼神经、外展神经麻痹，蛛网膜下腔出血等案例的逐渐增多以及 PPTA 合并较高的脑血管性疾病的患病率，故在诊断、治疗和随访过程中都应得到相应的重视。

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