·综述·

丘脑供血及丘脑缺血性卒中临床表现

刘毅 孙邈 吉训明 王翠 蔺建文 王苏平

【摘要】 丘脑卒中占全部脑血管病的2%～3%。丘脑解剖学结构复杂，供血动脉变异繁多，因此丘脑缺血性卒中临床表现多样，急性期临床难以准确诊断。本文旨在归纳和总结丘脑解剖学结构、丘脑供血及丘脑缺血性卒中相应临床表现，提高临床医师对丘脑缺血性卒中的全面认识，提高急性期的诊断与治疗效率。

【关键词】 卒中； 脑缺血； 丘脑； 综述

Clinical features of thalamic blood supplies and thalamic ischemic stroke

LIU Yi[1], SUN Miao[2], JI Xun-ming[3], WANG Cui[1], LIN Jian-wen[1], WANG Su-ping[1]
[1]*Department of Neurology, Dalian Municipal Central Hospital, Dalian 116033, Liaoning, China*
[2]*School of Pharmacy, Nantong University, Nantong 226019, Jiangsu, China*
[3]*Department of Neurology, Xuanwu Hospital, Capital Medical University, Beijing 100053, China*
Corresponding author: LIU Yi (Email: letaliu@bjmu.edu.cn)

【**Abstract**】 Thalamic stroke accounts for 2%–3% of total cerebrovascular diseases. Thalamus contains multiple complex nuclei with variant blood supplies, therefore thalamic ischemic stroke presents various clinical manifestations which will emerge difficulties in precise clinical diagnosis at acute stage. This review summarizes and integrates thalamic anatomical structure, blood supplies and corresponding clinical manifestations, aiming to provide overview of thalamic ischemic stroke and to improve efficacy of early diagnosis and treatment.

【**Key words**】 Stroke; Brain ischemia; Thalamus; Review
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丘脑亦称背侧丘脑，位于端脑与中脑之间，是间脑中最大的卵圆形灰质核团。丘脑是大脑皮质与脑干、小脑和脊髓多神经纤维的中继站，参与调节意识、认知、精神、语言、运动、感觉、视觉、自主神经系统等。丘脑卒中占全部脑血管病的2%～3%。丘脑核团复杂，供血动脉变异繁多，故丘脑缺血性卒中临床表现多样，急性期临床难以准确诊断[1]。目前，关于丘脑缺血性卒中的综述多通过临床表现并结合病变部位予以总结[2-6]，尚缺少关于丘脑供血动脉病变及其相应临床表现的归纳。笔者结合丘脑解剖学结构和丘脑缺血性卒中临床表现，发现此类患者不同的供血动脉具有的特征性临床表现，对早期诊治具有重要意义。本文归纳丘脑供血和丘脑缺血性卒中的相应临床表现，并追溯丘脑解剖学结构，旨在提高临床医师对丘脑缺血性卒中的全面认识，以提高丘脑缺血性卒中急性期的诊断与治疗效率。

一、丘脑供血和丘脑缺血性卒中临床表现

Salamon[7]的尸检结果显示，丘脑主要由4支动脉供血，分别为发自后交通动脉（PCoA）近端1/3处的丘脑结节动脉、发自大脑后动脉（PCA）P1段的丘脑旁正中动脉（亦称丘脑穿通动脉）、发自大脑后动脉P2段的丘脑膝状体动脉和脉络膜后动脉（包括内侧群和外侧群；图1，2[7-8]）。

1. 丘脑结节动脉 起自后交通动脉近端1/3处，于丘脑内伴乳头丘脑束走行，供血丘脑前内侧核团

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作者单位：116033 辽宁省大连市中心医院神经内科（刘毅，王翠，蔺建文，王苏平）；226019 南通大学药学院（孙邈）；100053 北京，首都医科大学宣武医院神经内科（吉训明）
通讯作者：刘毅（Email：letaliu@bjmu.edu.cn）

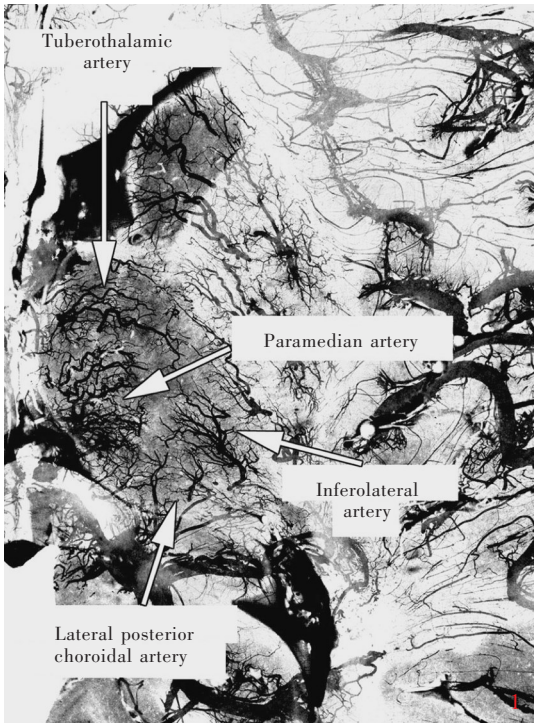
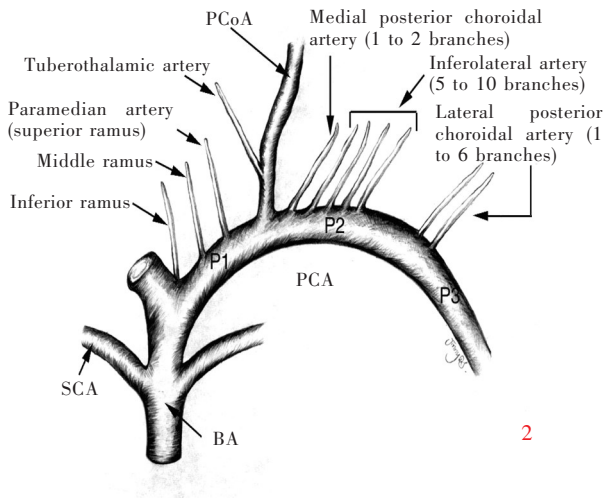


图1　Salamon应用血管示踪剂显示，丘脑主要由4支动脉供血，分别为丘脑结节动脉、丘脑旁正中动脉、丘脑膝状体动脉和脉络膜后动脉[7-8]

Figure 1　Illustration of thalamic vascular complexity within the 4 major vascular territories (tuberothalamic artery, paramedian artery, inferolateral artery and lateral posterior choroidal artery), as shown by injection of tracer substance into postmortem human blood vessels by Salamon[7-8].



BA，basilar artery，基底动脉；SCA，superior cerebellar artery，小脑上动脉；PCA，posterior cerebral artery，大脑后动脉；PCoA，posterior communication artery，后交通动脉

图2　丘脑供血动脉来源及其分支示意图[7-8]

Figure 2　Illustration of origin of feeding arteries of thalamus and their branches[7-8].

和前外侧核团。有1/3患者丘脑结节动脉缺如，代之以丘脑旁正中动脉供血[9]。丘脑结节动脉供血丘脑前核、膝状体核、丘脑腹前核、腹外侧核嘴部、背内侧核腹极和内髓板腹侧。丘脑结节动脉供血区缺血性卒中表现为认知功能障碍、行为异常、失语和视觉忽视，其中，优势半球受累表现为以近记忆力减退为主的认知功能障碍；非优势半球受累表现为视觉忽视；行为异常表现为意志缺乏和人格改变（包括情感欣快、淡漠，失去自主性，情感不确定性）；丘脑结节动脉供血区缺血性卒中后失语在丘脑缺血性卒中中最为常见，表现为音调降低、音量减小、理解困难、命名困难、找词困难。双侧丘脑结节动脉供血区缺血性卒中提示解剖学上双侧丘脑结节动脉共干，临床表现更严重、恢复时间更长。对于后交通动脉未开通患者，丘脑旁正中动脉供血区缺血性卒中也表现为丘脑结节动脉供血区缺血性卒中症状。

2. 丘脑旁正中动脉　存在多种变异，最常见的是双侧丘脑旁正中动脉分别起自双侧大脑后动脉P1段或基底动脉（BA）底端；还可见双侧丘脑旁正中动脉共干于同侧大脑后动脉P1段或基底动脉底端，称为Percheron动脉，或者双侧丘脑旁正中动脉共干于双侧大脑后动脉P1段，形成脑桥动脉[10]。上述解剖学变异可以导致双侧丘脑旁正中动脉供血区缺血性卒中同时发生。丘脑旁正中动脉供血大部分丘脑中央后部（包括中线核、板内核、背内侧核、部分腹外侧核）和中脑上部。丘脑旁正中动脉供血区缺血性卒中主要表现为嗜睡、认知功能障碍、精神症状、眼部症状、失语和扑翼样震颤，其中，认知功能障碍较为常见，亦称丘脑性痴呆，表现为定向力障碍、顺行性遗忘，较丘脑结节动脉供血区缺血性卒中致认知功能障碍更严重；精神症状表现为虚构、易激惹、易怒、情感淡漠；中脑受累表现为核性眼肌麻痹和缩瞳[11]；优势半球受累致失语表现为音量减小、语量减少、非流利性语义错误、胡言乱语，而复述正常；极少患者可见扑翼样震颤。

3. 丘脑膝状体动脉 由大脑后动脉P2段发出的5～10支动脉分支构成，包含3群，即内侧膝状体群、膝状体间群和外侧膝状体群。内侧膝状体动脉供血外1/2的内侧膝状体核；膝状体间动脉是大脑后动脉发出的最长、垂直度最高的终末动脉，自膝状体之间穿出，沿外髓板向上，供血大部分丘脑腹后侧核和腹外侧核；外侧膝状体动脉供血丘脑枕和背外侧核。丘脑膝状体动脉供血区缺血性卒中在丘脑缺血性卒中中最为常见，典型临床表现为以深感觉障碍为主的感觉异常伴轻偏瘫，感觉异常可以累及面部和四肢；此外，还表现为构音障碍、失语、肌张力障碍和痛觉过敏等，其中，失语表现为言语欠流利、理解和命名障碍；肌张力障碍表现为丘脑手（包括前臂旋前、腕部屈曲、掌指关节屈曲、指间关节伸直）和舞蹈样动作[8]。丘脑痛常见于右侧丘脑病变[12]。丘脑膝状体动脉也可以供血部分内囊，内囊受累表现为中枢性面瘫和构音障碍。同侧肢体感觉减退伴共济失调性轻偏瘫常提示对侧丘脑病变。Dejerine和Roussay于1906年首次报告丘脑膝状体动脉供血区缺血性卒中，并称为丘脑综合征（亦称Dejerine-Roussay综合征）[13-14]。

4. 脉络膜后动脉 起自大脑后动脉P2、P3段，以丘脑膝状体动脉为界分为内侧群（P2段）和外侧群（P3段），其中，内侧群供血下丘脑、中脑、内1/2的内侧膝状体核、板间核后部和部分丘脑枕；外侧群供血外侧膝状体、丘脑枕核下外侧部、背外侧核和后外侧核。脉络膜后动脉供血区缺血性卒中表现为视野缺损、偏深感觉障碍、轻偏瘫、短暂性遗忘和失语[15-16]，其中，视野缺损主要呈扇形，也可见上象限盲或下象限盲。由于脉络膜前动脉代偿良好，脉络膜后动脉供血区缺血性卒中的文献报道较少。

二、丘脑解剖学结构

丘脑主要分为5个部分，前端突起为前结节，后端膨大为丘脑枕，中间被“Y”字形内髓板分为前核群、内侧核群和外侧核群。双侧丘脑内侧面构成第三脑室外壁上部，通过丘脑间粘连。丘脑核团分为非特异性核团、特异性核团和联络性核团。

1. 非特异性核团 亦称古丘脑，包含网状核、中线核和板内核，与大脑皮质、基底节、脑干、小脑和脊髓均存在广泛联系，其中，网状核包绕丘脑，接受网状上行激活系统的传入纤维并上传至大脑皮质，对睡眠-觉醒、注意力和惊厥具有重要调节作用[17]；中线核和板内核接受脑干、脊髓和小脑的传入纤维，并与大脑皮质纤维联络，调节自主神经系统；板内核与基底节区形成复杂的纤维联络，包括壳核-苍白球-板内核参与感觉运动通路，苍白球-腹侧纹状体-板内核参与边缘系统，尾状核-纹状体背侧或黑质-板内核参与认知功能[8,18]；中线核接受中脑导水管周围灰质和脊髓丘脑束的传入纤维，形成伤害性感受信息的情感动机成分[19]。

2. 特异性核团 系进化较新的丘脑核群，包括腹前核、腹外侧核和腹后核，主要作用是传导脊髓和脑干的特异性上行纤维至大脑皮质，其中，腹前核和腹外侧核传导小脑齿状核、苍白球、黑质传入纤维，并投射至运动中枢，调节运动功能；此外，还与眶额皮质和岛叶形成纤维联络，参与言语功能；腹后核包括腹后内侧核和腹后外侧核，与感觉皮质形成纤维联络，前者传导头颈部来源的三叉丘系和由孤束核发出的感觉和味觉纤维，后者接受躯体、四肢来源的内侧丘系和脊髓丘系的纤维。

3. 联络性核团 亦称新丘脑，包括前核、内侧核和外侧核的背侧核群，与丘脑其他核团和大脑皮质存在丰富的纤维联络，其中，前核和扣带回作为中继站参与从乳头体至海马形成的Papez回路，此外，前核还参与内脏活动；外侧核的背内侧核群、枕内侧核和部分前核与边缘系统存在纤维联络。联络性核团对认知功能、情感、表达或动机均具有重要调节作用[8]。

综上所述，丘脑核团复杂，参与调节机体多项功能；丘脑供血动脉变异繁多。随着血管成像技术的发展和广泛应用，丘脑供血及丘脑缺血性卒中病变部位逐渐清晰。结合丘脑缺血性卒中临床表现、丘脑供血及丘脑缺血性卒中病变部位，可以提高急性期的诊断与治疗效率。今后尚待更多流行病学研究解析丘脑缺血性卒中的临床特点。

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参 考 文 献

[1] Liu Y, Lin J, Zhang L, Sarma AK, Zhao H, Wang C, Bing J, Pan X, Ji X, Wang S. Ipsilateral ptosis and contralateral ataxic hemiparesis as initial symptoms of combined tuberothalamic and paramedian artery infarction[J]. J Stroke Cerebrovasc Dis, 2018, 27:E148-149.

[2] Chen KQ, Zhong JX, Diao SY, Sun QS, Liu HZ, Zheng HL. Analysis of the clinical characteristics and cerebral angiography of patients with simple thalamus infarction[J]. Zhongguo Shi Yong Shen Jing Ji Bing Za Zhi, 2013, 16:13-15.[陈克强, 钟建新, 刁士元, 孙巧松, 刘华钊, 郑红丽. 单纯性丘脑梗死的临床特点和脑血管造影分析[J]. 中国实用神经疾病杂志, 2013,

16:13-15.]
[3] Liu QQ, Li GZ. The clinical symptoms and related mechanism of thalamic infarction[J]. Yi Xue Zong Shu, 2013, 19:1947-1950.[刘卿卿, 李国忠. 丘脑梗死临床症状及其相关机制[J]. 医学综述, 2013, 19:1947-1950.]
[4] Kumral E, Deveci EE, Colak AY, Caginda AD, Erdogan C. Multiple variant type thalamic infarcts: pure and combined types [J]. Acta Neurol Scand, 2015, 131:102-110.
[5] Chen XY, Wang Q, Wang X, Wong KS. Clinical features of thalamic stroke[J]. Curr Treat Options Neurol, 2017, 19:5.
[6] Li S, Kumar Y, Gupta N, Abdelbaki A, Sahwney H, Kumar A, Mangla M, Mangla R. Clinical and neuroimaging findings in thalamic territory infarctions: a review [J]. J Neuroimaging, 2018, 28:343-349.
[7] Salamon G. Atlas of arteries of the human brain[M]. France: Sandoz, 1971.
[8] Schmahmann JD. Vascular syndromes of the thalamus [J]. Stroke, 2003, 34:2264-2278.
[9] Bogousslavsky J, Regli F, Assal G. The syndrome of unilateral tuberothalamic artery territory infarction[J]. Stroke, 1986, 17: 434-441.
[10] Yang HH, Zhou XM, Miao ZR, Gao F. Bilateral thalamus infarction caused by hypothalamic paramedian artery variations: a report of two cases[J]. Zhonghua Shen Jing Yi Xue Za Zhi, 2014, 13:842-843.[杨海华, 周晓梅, 缪中荣, 高峰. 丘脑旁正中动脉变异引起双侧丘脑梗死二例报道分析[J]. 中华神经医学杂志, 2014, 13:842-843.]
[11] Matsuzono K, Manabe Y, Takahashi Y, Narai H, Omori N, Abe K. Combined ipsilateral oculomotor nerve palsy and contralateral downbeat nystagmus in a case of cerebral infarction [J]. Case Rep Neurol, 2014, 6:134-138.
[12] Bible E. Stroke: MRI might identify patients at risk of poststroke thalamic pain[J]. Nat Rev Neurol, 2012, 8:412.
[13] Jahngir MU, Qureshi AI. Dejerine Roussy syndrome [J]. StatePearls[Internet], 2018.
[14] Kirman BH. The thalamic syndrome[J]. Br Med J, 1947, 2:109.
[15] Ghika J, Bogousslavsky J, Henderson J, Maeder P, Regli F. The jerky dystonic unsteady hand: a delayed motor syndrome in posterior thalamic infarctions[J]. J Neurol, 1994, 241:537-542.
[16] Neau JP, Bogousslavsky J. The syndrome of posterior choroidal artery territory infarction[J]. Ann Neurol, 1996, 39:779-788.
[17] Llinas R, Ribary U. Consciousness and the brain, the thalamocortical dialogue in health and disease [J]. Ann NY Acad Sci, 2001, 929:166-175.
[18] Sidibe M, Paré JF, Smith Y. Nigral and pallidal inputs to functionally segregated thalamostriatal neurons in the centromedian/parafascicular intralaminar nuclear complex in monkey[J]. J Comp Neurol, 2002, 447:286-299.
[19] Willis WD Jr. Nociceptive functions of thalamic neurons[M]. New York: Elsevier, 1997: 373-424.

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Clinical sessions focus on community risk factors, emergency care, acute neuroimaging, acute endovascular and acute nonendovascular treatment, diagnosis of stroke etiology, cerebral large artery disease, in-hospital treatment, clinical rehabilitation and recovery, and health services, quality improvement, and patient-centered outcomes. Basic science sessions focus on vascular biology in health and disease, basic and preclinical neuroscience of stroke recovery, and experimental mechanisms and models. Further specialized topics include pediatric stroke, intracerebral hemorrhage, nursing, preventive strategies, vascular cognitive impairment, aneurysms, subarachnoid hemorrhage, neurocritical care, vascular malformations, and ongoing clinical trials. Presentations on these topics attract a wide range of healthcare professionals and investigators including adult and pediatric neurologists, neurosurgeons, neuroradiologists and interventional radiologists, physiatrists, emergency medicine specialists, primary care physicians, hospitalists, nurses and nurse practitioners, rehabilitation specialists, physical, occupational, and speech therapists, pharmacists, and basic researchers spanning the fields of cerebrovascular function and disease.