·指　　南·

成人股骨头坏死临床诊疗指南(2016)

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股骨头坏死曾被称为股骨头缺血性坏死和股骨头无菌性坏死,是骨科常见的难治性疾病。对任何年龄段、任何病理分期的患者,规范的诊疗方案都非常重要。“股骨头坏死诊疗专家意见(2007)”、“成人股骨头坏死诊疗专家共识(2012)”的制定为国内股骨头坏死诊疗的规范化起到了巨大的推动作用,但在分期规范化与治疗方式的选择方面仍存在不足之处。

为了更加规范而有效地诊治股骨头坏死,中国医师协会骨科医师分会显微修复工作委员会、中国修复重建外科专业委员会骨缺损及骨坏死学组和中华医学会骨科分会显微修复学组共同组织国内股骨头坏死研究领域的专家,于2015年3月21日经过对既往专家共识的讨论、修改,结合近几年的研究进展,制定了成人股骨头坏死临床诊疗指南。

一、概述

(一)定义:股骨头坏死是股骨头静脉淤滞、动脉血供受损或中断使骨细胞及骨髓成分部分死亡及发生随后的修复,继而引起骨组织坏死,导致股骨头结构改变及塌陷,引起髋关节疼痛及功能障碍的疾病[1-10]。

(二)流行病学:我国股骨头坏死的患病率为平原农民11.76/万,城市居民9.57/万,工人7.92 /万,山区农民6.29/万,沿海渔民5.53/万[11-12]。

(三)病因及高危人群:股骨头坏死可分为创伤性和非创伤性两大类。创伤性股骨头坏死的主要致病因素包括股骨头颈骨折、髋臼骨折、髋关节脱位、髋部严重扭伤或挫伤(无骨折,有关节内血肿)[13-18];非创伤性股骨头坏死在我国的主要病因为皮质类固醇类药物应用、长期饮酒过量、减压病、血红蛋白病(镰状细胞贫血、镰状细胞血红蛋白C病、地中海贫血、镰状细胞特质等)、自身免疫病和特发性等[6,12,19-22]。吸烟、肥胖等增加了发生股骨头坏死的风险[23-24],被认为与股骨头坏死相关。

二、诊断标准

参照成人股骨头坏死专家共识[7-8]及国际股骨头坏死诊断标准[1,6]制定。

(一)临床特点:多以髋部、臀部或腹股沟区的疼痛为主,偶尔伴有膝关节疼痛,髋关节内旋活动受限。常有髋部外伤史、皮质类固醇类药物应用史、酗酒史及潜水员等职业史[6,11-12,20]。

(二)MRI影像:MR检查对股骨头坏死具有较高的敏感性[25-28]。表现为T1WI局限性软骨下线样低信号或T2WI“双线征”[26,29-30]。

(三)X线影像:正位和蛙式位是诊断股骨头坏死的X线基本体位,通常表现为硬化、囊变及“新月征”等[31]。

(四)CT扫描征象:通常出现骨硬化带包绕坏死骨、修复骨,或表现为软骨下骨断裂[32-34]。

(五)放射性核素检查:股骨头急性期骨扫描($^{99}Tc^{m}$-MDP、$^{99}Tc^{m}$-DPD等)可见冷区;坏死修复期表现为热区中有冷区,即“面包圈样”改变[35]。单光子发射计算机断层显像(Single-photon emission computed tomography,SPECT)或许可能提高放射性核素检查对股骨头坏死诊断的灵敏度[36-37]。正电子发射断层扫描(Positron emission tomography,PET)可能比MRI和SPECT更早发现股骨头坏死征象,并可以预测股骨头坏死的进展[38]。

(六)骨组织活检:骨小梁的骨细胞空陷窝多于50%,且累及邻近多根骨小梁,骨髓坏死。

(七)数字减影血管造影:表现为股骨头血供受损、中断或淤滞。不建议在诊断时常规应用。

除(一)外,(二)至(七)另外符合任意一条即可确诊。

三、鉴别诊断

对具有股骨头坏死类似临床症状、X线或MRI影像学表现的患者,应注意鉴别。

(一)中、晚期髋关节骨关节炎:当关节间隙变

窄并出现软骨下囊性变时与股骨头坏死不易鉴别。但股骨头坏死的CT表现为硬化并有囊性变，MRI改变以低信号为主，可据此鉴别。

（二）髋臼发育不良继发骨关节炎：X线表现为股骨头包裹不全，关节间隙变窄、消失，骨硬化及囊变，髋臼对应区出现类似改变，容易鉴别。

（三）强直性脊柱炎累及髋关节：常见于青少年男性，多为双侧骶髂关节受累，血清检测HLA-B27阳性，X线表现为股骨头保持圆形而关节间隙变窄、消失甚至融合，容易鉴别。部分患者长期应用皮质类固醇类药物可并发股骨头坏死，股骨头可出现塌陷但往往不严重。

（四）暂时性骨质疏松症（Transient osteoporosis）：中青年发病，属暂时性疼痛性骨髓水肿（Transient bone marrow edema syndrome）。X线片表现为股骨头颈甚至转子部骨量减少；MRI表现为T1WI均匀低信号、T2WI高信号，范围可至股骨颈及转子部，无带状低信号；病灶可在3~12个月内消散[39-41]。

（五）股骨头内软骨母细胞瘤：MRI表现为T2WI片状高信号，CT扫描呈不规则的溶骨破坏。

（六）软骨下不全骨折：多见于60岁以上患者，无明显外伤史，表现为突然发作的髋部疼痛，不能行走，关节活动受限。X线片示股骨头外上部稍变扁；MRI表现为T1WI及T2WI软骨下低信号线及周围骨髓水肿，T2抑脂像出现片状高信号[42-43]。

（七）色素沉着绒毛结节性滑膜炎：多发于膝关节，髋关节受累少见。累及髋关节者以青少年发病、髋部轻中度疼痛伴跛行、早中期关节活动轻度受限为特征。CT及X线片表现为股骨头颈或髋臼皮质骨侵蚀，关节间隙轻中度变窄；MRI表现为广泛滑膜肥厚，低或中度信号均匀分布。

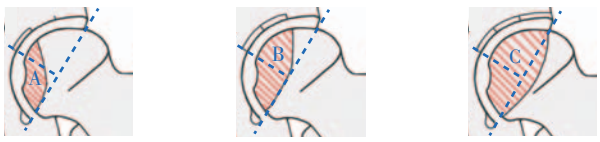
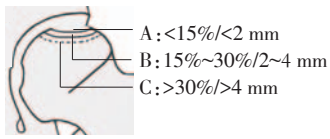
（八）滑膜疝：滑膜组织增生侵入股骨颈皮质的良性病变，通常无临床症状。MRI表现为股骨颈上部皮质T1WI低信号、T2WI高信号的小圆形病灶。

（九）骨梗死：发生在干骺端或长骨骨干的骨坏死，不同时期MRI影像表现不同。①急性期：病变中心T1WI呈与正常骨髓等或略高信号，T2WI呈高信号，边缘呈长T1、T2信号；②亚急性期：病变中心T1WI呈与正常骨髓等或略低信号，T2WI呈与正常骨髓等或略高信号，边缘呈长T1、长T2信号；③慢性期：T1WI和T2WI均呈低信号。

四、分期

建议采用国际骨微循环研究协会（Association Research Circulation Osseous，ARCO）分期系统（表1）。ARCO分期是1991年ARCO委员会在综合Ficat分期、Steinberg分期和日本骨坏死研究会分期后制定

表1　股骨头坏死ARCO分期

分期	0	1	2	3（早期）	3（晚期）	4
影像所见	所有检查均正常或不能诊断	X线片、CT正常，但骨扫描或MRI有异常	无新月征！X线片异常：硬化，骨小梁缺失，局部囊变	新月征！X线片出现新月征和（或）股骨头关节面变平，没有塌陷	X线片出现塌陷和（或）股骨头关节面变平	骨关节炎征象：关节间隙狭窄，髋臼改变，关节破坏
检查方法	X线片 CT 骨扫描 MRI	骨扫描 MRI 定量基于MRI	X线片 CT 骨扫描 MRI 定量基于MRI及X线片	X线片 CT 定量基于X线片	X线片 CT 定量基于X线片	X线片
部位	无	部位 内侧　中央　外侧 				无
定量	无	定量 股骨头受累面积 轻度A：<15% 中度B：15%~30% 重度C：>30%	新月征长度 A：<15% B：15%~30% C：>30%	股骨头表面塌陷面积及头面下沉 		无

的分期系统[44]，较之前的任何一种分期方法都更系统、更全面、更实用，在确定诊断、评估治疗效果和预后方面具有很高的价值。我国于2015年制订了股骨头坏死中国分期（表2）[45]，推荐临床工作中与ARCO分期同时应用。

五、股骨头坏死的治疗

治疗方法包括非手术治疗和手术治疗。

（一）非手术治疗

1.保护性负重：避免撞击性和对抗性运动。使用双拐可有效减轻疼痛，不主张使用轮椅。

2.药物治疗：建议选用抗凝、增加纤溶、扩张血管与降脂药物联合应用[46-47]，如低分子肝素、前列地尔、华法林与降脂药物的联合应用等。也可联合应用抑制破骨和增加成骨的药物，如磷酸盐制剂[48-49]、美多巴[50]等。药物治疗可单独应用，也可配合保髋手术应用。

3.中医药治疗：以中医整体观为指导，遵循“动静结合、筋骨并重、内外兼治、医患合作”的基本原则，强调早期诊断、病证结合、早期规范治疗。对高危人群及早期无痛患者以活血化瘀为主、辅以祛痰化湿、补肾健骨等中药，具有促进坏死修复、预防塌陷的作用；对早期出现疼痛等症状的股骨头坏死，在保护性负重的基础上应用活血化瘀、利水化湿的中药，能缓解疼痛、改善关节功能；对中晚期股骨头坏死，应用活血化瘀、利水化湿中药配合外科修复手术，能提高保髋手术效果[51-53]。

4.物理治疗：包括体外冲击波[54]、电磁场[55]、高压氧等[56]。

5.制动与牵引：适用于股骨头坏死早中期病例。

（二）手术治疗

股骨头坏死进展较快，非手术治疗效果不佳，多数患者需要手术治疗。手术方式包括保留患者自身股骨头为主的修复重建术和人工髋关节置换术两大类。保留股骨头的手术包括髓芯减压术、截骨术、带或不带血运的骨移植术等[1,6-8]，适用于股骨头坏死早期（ARCO 0~1期）或中期（ARCO 2~3B期），且坏死体积在15%以上的股骨头坏死患者。如果方法有效，可避免或推迟人工关节置换术。

1.髓芯减压术：手术开展时间长，疗效肯定。目前可分为细针钻孔减压术和粗通道髓芯减压术。

表2 股骨头坏死中国分期

分期	临床表现	影像学	病理改变
Ⅰ（临床前期，无塌陷）			
依坏死面积：Ⅰa 小< 15% Ⅰb 中15%~30% Ⅰc 大>30%	无	MRI（+），核素（+），X线片（-），CT（-）	骨髓组织坏死，骨细胞坏死
Ⅱ（早期，无塌陷）			
依坏死面积：Ⅱa 小< 15% Ⅱb 中15%~30% Ⅱc 大>30%	无或轻微	MRI（+），X线片（±），CT（+）	坏死灶吸收，组织修复
Ⅲ（中期，塌陷前期）			
依新月征占关节面长度：Ⅲa 小<15% Ⅲb 中15%~30% Ⅲc 大>30%	疼痛起始，跛行明显，疼痛中重度，内旋活动受限，内旋痛	MRI T2WI抑脂像示骨髓水肿，CT示软骨下骨折，X线片股骨头外轮廓中断，新月征阳性	软骨下骨折或经坏死骨骨折
Ⅳ（中晚期，塌陷期）			
依股骨头塌陷程度：Ⅳa 轻< 2 mm Ⅳb 中2~4 mm Ⅳc 重 4 mm	疼痛较重，跛行加重，内旋活动受限，内旋痛加重，外展、内收活动稍受限	X线片示股骨头塌陷，但关节间隙正常	股骨头塌陷
Ⅴ（晚期，骨关节炎）			
	疼痛重，跛行严重，所有活动（屈曲、外展、内外旋、内收）均受限	X线片示股骨头变扁、关节间隙变窄、髋臼囊性变或硬化	软骨受累，骨关节炎

注：坏死面积评估选用MRI或CT冠状面正中层面影像，通过坏死累及的层面数评估坏死体积。Ⅲ期发生塌陷的风险评估采用蛙式位或正位X线片上新月征占关节面长度的比例。Ⅳ期对塌陷程度的评估采用正位或蛙式位X线片，测量关节面塌陷深度。对X线片未显示股骨头塌陷但出现髋部疼痛的患者需进一步行MR与CT检查，出现骨髓水肿或软骨下骨板断裂征象提示坏死已进展到Ⅲ期。已发生股骨头塌陷且髋部疼痛症状超过6个月，提示关节软骨已发生明显退变（Ⅴ期）

其区别主要在于减压通道的直径，细针钻孔减压术的孔道直径为3、3.5或4 mm[57-58]，粗通道髓芯减压术为6 mm以上[59-60]。目前髓芯减压联合干细胞移植（或浓集自体骨髓单个核细胞移植）在国内医疗机构的临床应用效果较好[61-63]，因此在获得国家资质的前提下可以使用。

2.不带血运骨移植术：应用较多的术式有经股骨转子减压植骨术、经股骨头颈灯泡状减压植骨术等[64]。植骨方法包括压紧植骨、支撑植骨等，植骨材料包括自体皮质骨和松质骨、异体骨、骨替代材料[65-68]。

3.截骨术：目的是将坏死区移出股骨头负重区。截骨术包括内翻或外翻截骨、经股骨转子旋转截骨等，以不改建股骨髓腔为原则选择术式[69-70]。

4.带血运自体骨移植术：自体骨移植分为髋周骨瓣移植及腓骨移植[6-8,71-72]。髋周带血管蒂骨瓣移植包括：①带旋股外侧血管升支髂骨（膜）瓣转移术[73-74]；②旋股外侧血管升支臀中肌支大转子骨瓣转移术[75-78]；③带旋股外侧血管横支的大转子骨瓣转移术[75-78]；④带旋髂深血管蒂的髂骨（膜）瓣转移术；⑤对整个股骨头甚至部分股骨颈受到累及者采用的横支大转子骨瓣联合升支髂骨（膜）瓣再造股骨头（颈）[79]；⑥髋关节后方入路股内侧血管深支大转子骨瓣、臀上血管深上支髂骨瓣等。髋周带血管蒂骨瓣手术创伤小、疗效确切、手术方法容易掌握，推荐使用。为增加股骨头内的强力支撑，在应用髋周带血管蒂骨瓣时可联合支撑材料植入，能够避免术后股骨头塌陷，其中短期疗效好[80-81]，长期疗效有待确定。吻合血管腓骨移植的手术效果目前也较为肯定[82-84]，推荐使用。带血运自体骨移植术式的选择可根据其各自优缺点、术者的熟练程度等因素综合考虑。

5.人工关节置换术：股骨头塌陷较重（ARCO 3C期、4期）、出现关节功能严重丧失或中度以上疼痛，应选择人工关节置换术[85-90]。一般认为，非骨水泥型或混合型假体的中长期疗效优于骨水泥型假体。股骨头坏死的人工关节置换术要特别注意：①患者长期应用皮质类固醇类药物或有其他基础病需持续治疗，使感染的风险升高；②患者长期不负重、骨质疏松等原因导致假体容易穿入髋臼；③既往保留股骨头手术会给关节置换造成技术困难；④激素性、酒精性股骨头坏死不仅仅是股骨头的病变，其周围及全身骨质均已受损，因此关节置换术的远期疗效可能不及骨关节炎或创伤性股骨头坏死。

（三）治疗方案的选择原则

股骨头坏死治疗方案的选择应综合考虑分期、分型、坏死体积、关节功能及患者年龄、职业及对保存关节治疗的依从性等因素（图1）。

1.无临床症状、坏死位于非负重区、坏死面积<15%者可严密观察，定期随访。无临床症状、坏死位于负重区、坏死体积>30%者应积极治疗，不应等待症状出现。可联合应用髓芯减压术或非手术治疗手段[91]。

2.ARCO 0期：如果一侧确诊，对侧应高度怀疑，宜行双侧MR检查，建议每3~6个月随访一次。

3.ARCO 1、2期：有症状或坏死面积15%~30%者，应积极行下肢牵引及药物等非手术治疗，也可行保留关节的手术治疗，采用髓芯减压术[57-60,92]或配合干细胞移植或浓集自体骨髓单个核细胞移植。ARCO 2C期可采用带或不带血运的骨移植术（可联合支撑材料）[66-68,80,93-95]、截骨术等。

4.ARCO 3期早期：采用带血运自体骨移植术（可联合支撑材料）[66-68,80-81]。

5.ARCO 3期晚期：采用带血运骨移植术（可联合支撑材料）[81]。

6.ARCO 4期：出现严重的髋关节功能丧失或疼痛，应选择人工关节置换术。ARCO 2C、3期有剧烈疼痛的中老年患者可选择人工关节置换术。如果症状轻、年龄小，可选择保留关节手术，建议采用带血管自体骨骨移植（如带血管蒂大转子骨瓣联合髂骨移植等），可联合钽棒支撑。保留股骨头手术常可应用几种术式中的一种或两种以上的组合。非手术治疗也应包含在综合治疗范围内。

7.年龄因素：是治疗方案选择的另一个关键因素。青壮年患者活动量较大，应选择既能保留股骨头又不会对将来的人工关节置换术造成不利影响的治疗方案。建议采用髓芯减压术（干细胞移植）、带血运自体骨移植术、不带血运骨移植术（坏死范围15%~30%）。中年患者若处于较早期阶段（无塌陷）应尽最大努力保留股骨头，如采用髓芯减压术、带或不带血运的骨移植术；若处于中晚期，则应结合患者主观愿望及技术条件选择保留股骨头的治疗方案或人工关节置换术，当采用人工关节置换时假体选择应充分考虑二次翻修的可能。老年病例建议行人工全髋关节置换术，对高龄（>75岁）患者视原日常活动状况、髋部骨质情况、寿命长短的预期等因素而定。建议行双极人工股骨头置换术或

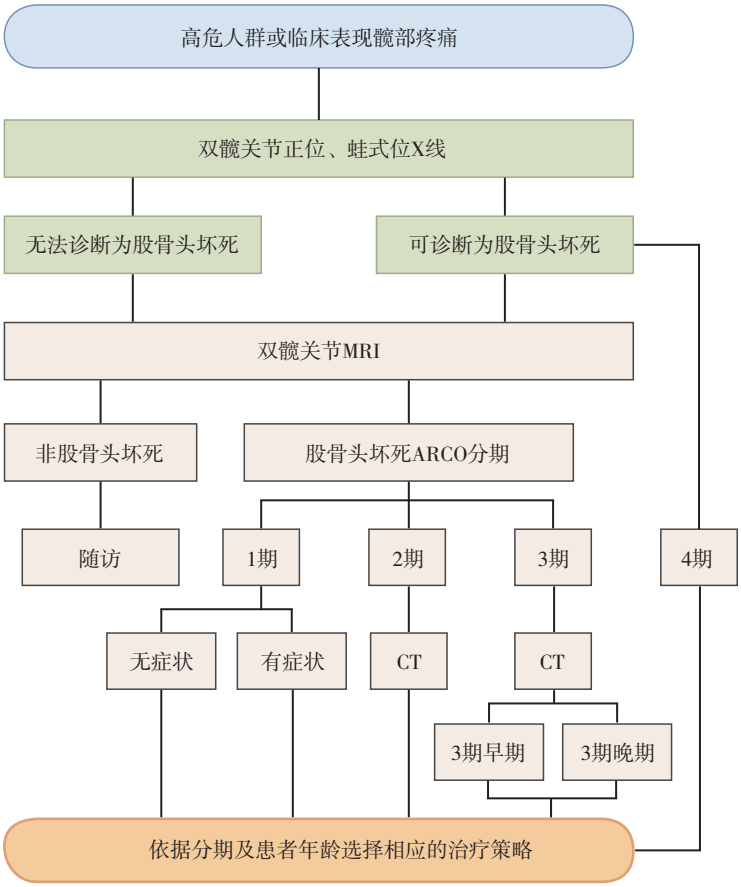


图1 成人股骨头坏死临床诊断流程图

全髋关节置换术。

(四)疗效评价与康复练习

1.疗效评价:对股骨头坏死的疗效评价可分为临床评价和影像学评价两部分[96]。临床评价采用髋关节功能评分(如Harris评分、WOMAC评分、中华医学会骨科学分会百分法),应根据相同分期、相似坏死面积、相同治疗方法分类逐例评价。同时建议行步态分析。

影像学评价应用X线片,采用同心圆模板观察股骨头外形、关节间隙及髋臼变化。股骨头坏死中国分期Ⅱ期以内的病变评估应有MRI资料。对带血运骨移植患者应行数字减影血管造影检查,用来评价血运恢复情况[77]。建立患者病例档案,评价不同病因、坏死时期、年龄、治疗方法的疗效,有助于规范股骨头坏死的治疗。

2.康复锻炼:可防止股骨头坏死患者废用性肌肉萎缩,是促使其早日恢复功能的有效手段。功能锻炼应以主动活动为主,被动活动为辅,由小到大,由少到多,逐渐增加;并根据股骨头坏死的分期、治疗方式、髋关节功能评分及步态分析结果选择适宜的锻炼方法[97-98]。

①卧位抬腿法:平仰卧,抬高患肢,屈髋屈膝90°,再放平患肢,动作反复。每日200次,分3~4次完成。应用于股骨头坏死保守治疗及外科治疗术后卧床期。

②坐位分合法:坐在椅子上,双手扶膝,双脚与肩等宽,双腿同时充分外展、内收。每日300次,分3~4次完成。应用于股骨头坏死保守治疗及外科治疗术后可部分负重期。

③立位抬腿法:手扶固定物,身体保持竖直,抬高患肢,屈髋屈膝90°,使身体与大腿成直角,再放下患肢,动作反复。每日300次,分3~4次完成。应用于股骨头坏死保守治疗及外科治疗术后可部分负重期。

④扶物下蹲法:手扶固定物,身体直立,双脚与肩等宽,下蹲后再起立,动作反复。每日300次,分3~4次完成。应用于股骨头坏死保守治疗及外科治疗术后可完全负重期。

⑤内旋外展法:手扶固定物,双腿分别做充分的内旋、外展、划圈动作。每日300次,分3~4完成。应用于股骨头坏死保守治疗及外科治疗术后可完全负重期。

⑥扶拐步行训练或骑自行车锻炼：应用于股骨头坏死保守治疗及外科治疗术后可完全负重期。

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