

磁共振成像

月刊
总第146期
2010年1月创刊

2024年第15卷第8期
2024年8月20日出版

刊名题写：时任第十一届全国人大常委会副委员长韩启德

主管单位 中华人民共和国国家卫生健康委员会

主办单位
中国医院协会
首都医科大学附属北京天坛医院

终身名誉主编 戴建平

主编 金征宇
副主编 陈敏 程敬亮 付海鸿
贺光军 洪楠 刘士远
马林 宋彬 田捷
王梅云 鲜军舫 严福华
赵心明

社长 贺光军
编辑部主任 王志强
责任编辑 王志强 王婷
顾立萍 贺光军
责任校对 张琴 江俊
学科编辑 胡磊 陈佳杰
田蔚莉 王浩入
王星皓 杨镇圭
庄彩玉 钟毅欣
出版单位 《磁共振成像》
杂志社有限公司

发行范围 公开
发行单位 本刊发行部

国内发行 中国邮政集团有限公司
北京市报刊发行局
邮发代号 2-855
国外总发行 中国国际图书贸易集团有限公司
国外发行代号 M 8958
印刷单位 北京科信印刷有限公司

电话 010-67113815
E-mail editor@cjmri.cn
网址 www.chinesemri.com
定价 每册30元

国内统一连续出版物号
CN 11-5902/R

国际标准连续出版物号
ISSN 1674-8034

广告发布登记证号 京西市监广登字20170242号
本刊刊出的所有论文不代表本刊编委会的观点，除非特别声明

目次

特别关注

- MRI功能成像及定量成像技术在宫颈癌诊疗中的应用述评
.....张钦和, 刘爱连 (1)
- 磁共振弹性成像在宫颈癌诊断中的初步应用研究
.....刘强, 石喻, 孙洪赞, 周明慧, 王志颖, 罗百合,
潘晨, 刘柯瑾, 乞文旭 (12)
- 治疗前多参数MRI影像组学特征预测晚期宫颈鳞癌患者新辅助化疗后
淋巴结转移刘金金, 董林道, 杨紫涵, 张月洁, 吴青霞, 王梅云 (17)
- 基于治疗前多参数MRI影像组学特征预测局部晚期宫颈鳞癌患者新辅助
化疗后脉管浸润
.....董林道, 刘金金, 张月洁, 杨紫涵, 吴青霞, 王梅云 (25)
- 基于APTw的影像组学术前预测宫颈癌淋巴血管间隙侵犯
.....安琪, 张钦和, 仲林, 马长军, 张瀚月, 李军,
王思齐, 林良杰, 田士峰, 刘爱连 (31)
- 酰胺质子转移成像与动态对比增强MRI评估宫颈癌神经侵犯的价值
.....张倩瑜, 刘架伸, 田士峰, 张钦和, 宋庆玲, 陈丽华,
马长军, 王楠, 林良杰, 王家正, 刘爱连 (39)
- 基于矢状位T2WI瘤内瘤周影像组学列线图术前预测IB期和IIA期宫颈癌的
研究徐青, 彭雪艳, 郭长义, 朱欣阳, 贺朝 (46)

论著

临床研究

- 阿尔茨海默病患者大脑形态学及结构协变网络的改变
.....王燕, 赵魁, 朱紫琳, 黎艺琳, 邱士军 (52)
- 网络游戏成瘾患者脑功能异常静息态功能磁共振成像研究
.....陈君, 张勇, 牛晓玉, 张孟哲, 马浣耀, 程敬亮 (59)
- 阿尔茨海默病海马亚区水通道蛋白磁共振分子成像研究
.....施黎炜, 陈秋雁, 陈婷婷, 郑雨杉, 吴雅琪, 李朝阳, 魏鼎泰 (65)
- 基于磁共振动脉自旋标记成像的2型糖尿病患者大脑灌注特征网络研究
.....班淇琦, 瞿航, 王苇, 赵义, 朱珠 (73)
- 基于ALFF评估腰椎间盘突出症的脑静息态功能磁共振成像研究
.....薛琴, 屠建春, 戴德纯, 吕莹, 徐婷 (78)
- 基于DKI技术的MK参数值评价中重度OSA患者脑微结构损伤及认知功能
障碍的初步研究张宁, 彭琨, 刘青, 肖爱莲, 郭金霞 (84)
- 基于多模态MRI探讨高血压相关脑体积及脑白质信号改变的临床研究
.....秦银银, 许建铭, 朱建兵, 杨姣, 王晓彦, 彭博, 马新伟 (90)

MRI探索儿童斜坡开始髓化的年龄界值

.....唐琼梅, 黄勤鹏, 胡石腾 (97)

基于磁共振影像组学和语义特征对高级别胶质瘤和转移瘤的鉴别研究

.....徐子超, 张娅, 柳青, 史朝霞, 王静, 卫宏洋, 彭兴珍, 宗会迁 (103)

基于SyMRI弛豫定量分析和QSM预测早期帕金森病患者脑黑质微结构变化的临床价值研究

.....方子榕, 陈秋雁, 叶灵, 余波, 黄财城, 余燕武 (110)

基于Kaiser评分临床-多参数MRI诊断模型在乳腺良恶性病变鉴别

诊断中的价值.....高文霞, 盛美红, 肖建云, 倪建, 严循成, 孙蓉 (117)

心脏磁共振评价慢性肾脏病患者不同左心室构型的心肌组织特征

.....蒲倩, 杨慧义, 彭鹏飞, 岳汛, 岳书婷, 邓巧, 唐露, 吴韬, 于洋, 付平, 余少斌, 孙家瑜 (124)

基于瘤内和瘤周影像组学模型预测肝细胞癌微血管侵犯的临床应用价值:

一项多中心研究

.....朱珠, 郁义星, 陆健, 许大波, 张涛, 方伟, 陆心雨, 顾文豪 (132)

胎儿期I型先天性胆总管囊肿的MRI影像特征和肝胆发育的参数测量

.....谷磊磊, 高铎, 韩学芳, 耿左军, 周立霞 (139)

IVIM、mDixon-Quant多参数定量成像联合血细胞参数评估直肠癌Ki-67

表达水平的研究

.....赵雅迪, 李伟兰, 宋健, 周伟, 薛慧, 李垣婕, 王志强, 谢宗源 (145)

T2WI影像组学鉴别卵巢成人型颗粒细胞瘤与DWI高信号纤维-卵泡膜

细胞肿瘤.....王丰, 秦思源, 周延, 王奇政, 刘剑羽, 郎宁 (152)

磁共振集合序列与T2mapping序列在慢性冈上肌腱炎定量评估中的价值研究

.....徐奋玲, 田兆荣, 田博, 龚瑞, 马芳芳, 胡靖波, 王志军 (158)

技术研究

人工智能辅助压缩感知与并行采集技术在肩关节MRI中的对比研究

.....杨泽铨, 詹艺, 施楠楠, 商爱, 单飞, 沈杰 (166)

基础研究

MR弹性成像与钆塞酸二钠增强T1 mapping定量评估兔肝纤维化的对比研究

.....张豪, 邹立秋, 钟文新, 麦晓飞, 石桥 (172)

病例报告

胰腺黏液纤维肉瘤MRI表现一例并文献复习

.....张曼曼, 李旭, 马培旗, 张小艳, 张磊 (179)

盆腔骨外尤文肉瘤/原始神经外胚层肿瘤影像学表现一例

.....杨璇如, 曹云太, 周伯琪, 郑小影, 马团乐, 范睿, 刘心怡, 曹明泰 (181)

综述

基于fMRI评价失眠障碍患者相关脑区脑功能的研究进展

.....陈珂珂, 武肖玲, 李中林, 邹智, 谷宇昂, 贾淑蕾, 张雪怡, 张淼, 李昊, 杨玲, 李永丽 (184)

慢性疼痛患者下行疼痛调制系统的磁共振成像研究进展

.....周慧玲, 雷婷, 陈莉, 杜勇 (189)

前列腺癌患者神经微环境潜在磁共振成像影像标志物的研究现状

.....齐东, 戚轩, 杨宏楷, 杜兵, 翟承凤, 何永胜 (194)

封面文章

卵巢纤维-卵泡膜细胞肿瘤和成人型颗粒细胞瘤是最常见的两种卵巢性索间质细胞瘤,前者为良性肿瘤,手术切除后预后良好,后者则为低度恶性肿瘤,可发生转移和复发,治疗原则同上皮性卵巢癌,常需行肿瘤细胞减灭术辅助化疗。但是这两种肿瘤的临床表现类似,均可伴雌激素水平升高,容易被混淆,术中冰冻病理也存在一定误诊率。因此,术前对两种肿瘤精准的影像学诊断和鉴别非常重要,有助于选择更合适的治疗方法。

既往研究显示成人型颗粒细胞瘤的特征性MRI表现之一为DWI高信号,通常这也是提示卵巢恶性肿瘤的征象之一,但是纤维-卵泡膜细胞肿瘤部分病例因含卵泡膜细胞比例较高也可表现为DWI高信号,这就为两者的鉴别诊断带来了困难。而且两种肿瘤还存在其他重叠的影像学表现,都使得它们在术前非常容易被误诊。

近年来,影像组学技术快速发展,在肿瘤诊断中显示出了极大的潜力,它可以从医学图像内部提取大量人眼无法识别的定量特征,从而无创地反映病变内部异质性及生物学信息。

本研究应用单因素分析和多因素logistic回归对卵巢纤维-卵泡膜细胞肿瘤和成人型颗粒细胞瘤患者的临床和常规MRI征象进行筛选,建立临床模型。其次,基于T2WI提取影像组学特征,应用K最佳和最小绝对收缩和选择算法进行特征筛选,构建影像组学模型并计算影像组学评分。最后,联合临床模型和影像组学评分构建列线图模型。应用受试者工作特征曲线和决策曲线评估各模型的性能。结果显示基于MRI的影像组学模型和列线图模型均展现了良好的效能,为术前准确区分两种肿瘤提供了有效的方法,对患者的临床决策有积极的意义。详见内文第152页。

扩散张量成像定量分析在胶质瘤分级及分子分型的研究进展
韩鑫, 卢洁 (201)

磁共振扩散加权成像鉴别颅内孤立性纤维瘤和不同级别脑膜瘤的研究进展
魏令珍, 曾庆师, 陈金明, 李美霖, 刘家皓, 王怀臻 (207)

基于磁共振成像的机器学习在眼眶肿瘤中的应用进展
王燕, 吴旭莎, 胡文钟, 李艳, 席一斌, 印弘 (212)

常规磁共振成像影像特征在鼻咽癌预后预测中的研究进展
杨凡, 林蒙, 张红梅 (218)

心脏磁共振特征追踪技术评估自身免疫性风湿病心肌应变的研究进展
刘源超, 王雯雯, 高瑛瑛, 祁荣兴 (224)

人工智能在类风湿性关节炎影像评估中的研究进展
李生虎, 王莉莉 (229)

书 讯

《MR医学影像诊断学》:科技哲学理论在专业学科教学中的应用
 (插页1)

《影像学》:医学影像学近现代发展历史及当代发展
 (插页2)

《脾胃论》第2版:脾胃病中医非物质文化遗产临床经典讲解
 (插页3)

《医学影像深度学习》:现代教育技术在影像学教育学习中的应用
 (插页4)

《医学课程思政百例》:基于案例分析的医学课程思政元素教育研究
 (插页5)

《医学类专业课程思政教学实录》:将价值观引导于知识传授和能力培养之中
 (插页6)

《运动损伤康复治疗学》第2版:传统体育运动损伤与康复问题探讨
 (插页7)

《党建引领文化铸魂医院发展经验谈》:医院党建文化发展及其重要价值
 (插页8)

磁共振成像
 办精品期刊 促学科发展 惠百姓健康

官方网站	在线投稿	知 知 乎 平 台	官方微博	搜狐平台	网易平台	哔哩哔哩	企 鹅 号	微信 平 台

CHINESE JOURNAL OF MAGNETIC RESONANCE IMAGING

CHINESE JOURNAL OF MAGNETIC RESONANCE IMAGING

ISSN 1674-8034, CN 11-5902/R, CODEN CCIHBW, Established in 2010 Monthly Vol. 15, No. 8, Aug 20, 2024

Responsible Institution

National Health Commission of the
People's Republic of China

Sponsor

Chinese Hospital Association
Beijing Tiantan Hospital of Capital
Medical University

Lifetime Honorary Editor-in-Chief

DAI Jianping

Editor-in-Chief

JIN Zhengyu

Associate Editor-in-Chief

CHEN Min	CHENG Jingliang
FU Haihong	HE Guangjun
HONG Nan	LIU Shiyuan
MA Lin	SONG Bin
TIAN Jie	WANG Meiyun
XIAN Junfang	YAN Fuhua
ZHAO Xinming	

President

HE Guangjun

Editing

Editorial Board of Chinese Journal of
Magnetic Resonance Imaging

Publishing

Publishing House of Chinese Journal
of Magnetic Resonance Imaging

General Distributor

Domestic: Beijing Newspaper and
Periodical Distribution Bureau of China
Post Group Co., Ltd.
Postal Code: 2-855
Overseas: China International Book
Trade Group Co., Ltd., P.O. Box 399,
Beijing, China
Code No.: M 8958

Mail Order

Third Floor, Building 4, No. 358,
Yudaihe East Street, Tongzhou District,
Beijing 101100, China

Tel & Fax 8610-67113815

E-mail editor@cjmri.cn

Website www.chinesemri.com

Price: USD 30.00

Contents

SPECIAL FOCUS

- 1 Review on the application of MRI functional and quantitative imaging techniques in the diagnosis and treatment of cervical cancer
ZHANG Qinhe, LIU Ailian
- 12 A preliminary application study of magnetic resonance elastography in the diagnosis of cervical cancer
LIU Qiang, SHI Yu, SUN Hongzan, ZHOU Minghui, WANG Zhiying, LUO Baihe, PAN Chen, LIU Kejin, QI Wenxu
- 17 Radiomics analysis for prediction of lymph node metastasis after neoadjuvant chemotherapy based on pretreatment MRI in locally advanced cervical squamous cell carcinoma
LIU Jinjin, DONG Linxiao, YANG Zihan, ZHANG Yuejie, WU Qingxia, WANG Meiyun
- 25 Prediction of lymphovascular space invasion in locally advanced cervical cancer patients after neoadjuvant chemotherapy based on pre-treatment multi-parameter MRI radiomics features
DONG Linxiao, LIU Jinjin, ZHANG Yuejie, YANG Zihan, WU Qingxia, WANG Meiyun
- 31 The radiomics model based on APT for preoperative prediction of cervical cancer lymphovascular space invasion
AN Qi, ZHANG Qinhe, ZHONG Lin, MA Changjun, ZHANG Hanyue, LI Jun, WANG Siqi, LIN Liangjie, TIAN Shifeng, LIU Ailian
- 39 The value of amide proton transfer weighted combined with dynamic contrast-enhanced MRI in evaluating cervical cancer nerve invasion
ZHANG Qianyu, LIU Jiashen, TIAN Shifeng, ZHANG Qinhe, SONG Qingling, CHEN Lihua, MA Changjun, WANG Nan, LIN Liangjie, WANG Jiazheng, LIU Ailian
- 46 Intra- and peritumoral sagittal T2WI radiomics nomogram for preoperative prediction of patients with stage IB and stage IIA cervical cancer
XU Qing, PENG Xueyan, GUO Changyi, ZHU Xinyang, HE Chao

ORIGINAL RESEARCH

CLINICAL ARTICLES

- 52 Altered brain morphometry and structural covariant networks based on cortical thickness in Alzheimer's disease
WANG Yan, ZHAO Kui, ZHU Zilin, LI Yilin, QIU Shijun
- 59 A resting-state functional magnetic resonance imaging study of abnormal brain function in patients with Internet gaming disorder
CHEN Jun, ZHANG Yong, NIU Xiaoyu, ZHANG Mengzhe, MA Longyao, CHENG Jingliang
- 65 Research on aquaporin magnetic resonance molecular imaging of hippocampal subfields in Alzheimer's disease
SHI Liwei, CHEN Qiuyan, CHEN Tingting, ZHENG Yushan, WU Yaqi, LI Zhaoyang, WEI Dingtai

- 73 Study on cerebral perfusion characteristic network of type 2 diabetes mellitus patients based on MR arterial spin labeling imaging
BAN Qiqi, QU Hang, WANG Wei, ZHAO Yi, ZHU Zhu
- 78 Evaluation of rest-state fMRI in patients with lumbar disc herniation based on ALFF
XUE Qin, TU Jianchun, DAI Dechun, LÜ Ying, XU Ting
- 84 Preliminary study of MK parametric map based on DKI technique in evaluating brain microstructural damage and cognitive impairment in patients with moderate and severe OSA
ZHANG Ning, PENG Kun, LIU Qing, XIAO Ailian, GUO Jinxia
- 90 Clinical study of hypertension-related brain volume and white matter hyperintensity changes based on multimodal MRI
QIN Yinyin, XU Jianming, ZHU Jianbing, YANG Jiao, WANG Xiaoyan, PENG Bo, MA Xinwei
- 97 Exploring the cut-off age value of marrow transformation in children's clivus by MRI
TANG Qiongmei, HUANG Qinpeng, HU Shiteng
- 103 Differentiation of high-grade glioma and metastatic tumor based on MRI radiomics and semantic features
XU Zichao, ZHANG Ya, LIU Qing, SHI Zhaoxia, WANG Jing, WEI Hongyang, PENG Xingzhen, ZONG Huiqian
- 110 Clinical value in predicting the microstructural alterations of substantia nigra in patients with early Parkinson's disease based on SyMRI relaxation quantitative analysis and QSM
FANG Zirong, CHEN Qiuyan, YE Ling, YU Bo, HUANG Caicheng, YU Yanwu
- 117 Value of a clinical-multiparametric MRI diagnostic model based on Kaiser score in the differential diagnosis of benign and malignant breast lesions
GAO Wenxia, SHENG Meihong, XIAO Jianyun, NI Jian, YAN Xuncheng, SUN Rong
- 124 Cardiac magnetic resonance evaluation of myocardial tissue characterization of different left ventricular phenotypes in patients with chronic kidney disease
PU Qian, YANG Huiyi, PENG Pengfei, YUE Xun, YUE Shuting, DENG Qiao, TANG Lu, WU Tao, YU Yang, FU Ping, YU Shaobin, SUN Jiayu
- 132 Clinical application value of predicting microvascular invasion in hepatocellular carcinoma using intratumoral and peritumoral radiomics models: A multicenter study
ZHU Zhu, YU Yixing, LU Jian, XU Dabo, ZHANG Tao, FANG Wei, LU Xinyu, GU Wenhao
- 139 Prenatal MRI findings of type I congenital choledochal cyst and parameter measurement of liver and gallbladder
GU Leilei, GAO Duo, HAN Xuefang, GENG Zuojun, ZHOU Lixia
- 145 IVIM, mDixon-Quant multiparameter quantitative imaging combined with blood cell parameters to assess Ki-67 expression levels in rectal cancer
ZHAO Yadi, LI Weilan, SONG Jian, ZHOU Wei, XUE Hui, LI Yuanjie, WANG Zhiqiang, XIE Zongyuan
- 152 T2WI-based radiomics for discriminating between ovarian adult-type granulosa cell tumor and ovarian fibroma-thecoma with high-signal intensity on DWI
WANG Feng, QIN Siyuan, ZHOU Yan, WANG Qizheng, LIU Jianyu, LANG Ning
- 158 The value of magnetic resonance image compilation and T2mapping sequence in the quantitative assessment of chronic supraspinatus tendonitis
XU Fenling, TIAN Zhaorong, TIAN Bo, GONG Rui, MA Fangfang, HU Jingbo, WANG Zhijun

About the cover

Ovarian fibroma-thecoma and ovarian adult-type granulosa cell tumor are the two most common types of ovarian sex cord-stromal tumors. The former is a benign tumor, which has good prognosis after resection, while the latter is a low-grade malignant tumor and can metastasize or recur. The treatment principle of ovarian adult-type granulosa cell tumor is the same as that of epithelial ovarian cancer, and cytoreductive surgery and adjuvant chemotherapy are often required. However, the clinical manifestations of these two tumors are similar, which are related to excessive estrogen production, and the misdiagnosis may be occur in intraoperative frozen section examination. Therefore, preoperative accurate differentiation of the two tumors is very important in order to select appropriate treatment.

Previous studies have shown that one of the MR characteristics of adult granulosa cell tumor is high-signal intensity on DWI, which is usually one of the features indicating ovarian malignancy. However, some fibroma-thecomas may also manifest high-signal intensity on DWI because of the high proportion of theca cells, which makes the differential diagnoses more difficult. In addition, the two tumors have other overlapping imaging features and therefore can be easily misdiagnosed before surgery.

In recent years, the rapid development of radiomics has shown great application potential in the diagnosis of tumor. This technique can extract abundant quantitative features that cannot be recognized by human eyes from medical imaging, and the heterogeneity and biological information of lesions can be carried out non-invasively.

This study selected clinical and routine MRI features of ovarian fibroma-thecoma and ovarian adult-type granulosa cell tumor by univariate analysis and multivariate logistic regression, and the clinical model was constructed. Secondly, radiomics features were extracted from T2WI. Select K best and least absolute shrinkage and selection operator algorithm were used to reduce the dimension and then the radiomics model was constructed by selected features, and a Radiomics score (Rad-Score) was calculated. Furthermore, the nomogram model was constructed by combining with clinical model and Rad-score. Finally, the receiver operator characteristic curves and decision curve analysis were used to evaluate the performance of all these models. The results showed that the MRI-based radiomics model and nomogram model showed good diagnostic efficiency, and could accurately identify the two tumors before surgery, which had positive significance for clinical decision-making. Please see text page 152.

TECHNICAL ARTICLE

- 166 Comparative use of artificial intelligence-assisted compressed sensing and parallel imaging for shoulder magnetic resonance imaging
YANG Zecheng, ZHAN Yi, SHI Nannan, SHANG Ai, SHAN Fei, SHEN Jie

ORIGINAL ARTICLE

- 172 Quantitative evaluation of liver fibrosis by MRE and Gd-EOB-DTPA-enhanced T1 mapping magnetic resonance imaging in a rabbit model
ZHANG Hao, ZOU Liqiu, ZHONG Wenxin, MAI Xiaofei, SHI Qiao

CASE REPORTS

- 179 Pancreatic myxofibrosarcoma: One case report and literature review
ZHANG Manman, LI Xu, MA Peiqi, ZHANG Xiaoyan, ZHANG Lei
- 181 Imaging findings of pelvic extraosseous Ewing sarcoma/primitive neuroectodermal tumor: One case report
YANG Airu, CAO Yuntai, ZHOU Boqi, ZHENG Xiaoying, MA Tuanle, FAN Rui, LIU Xinyi, CAO Mingtai

REVIEWS

- 184 Research progress in evaluating brain function of related brain regions in patients with insomnia disorder based on fMRI
CHEN Keke, WU Xiaoling, LI Zhonglin, ZOU Zhi, GU Yu'ang, JIA Shulei, ZHANG Xueyi, ZHANG Miao, LI Hao, YANG Ling, LI Yongli
- 189 Progress in magnetic resonance imaging studies of the descending pain modulation system in patients with chronic pain
ZHOU Huiling, LEI Ting, CHEN Li, DU Yong
- 194 Current status of potential magnetic resonance imaging markers in the neural microenvironment in prostate cancer patients
QI Dong, QI Xuan, YANG Hongkai, DU Bing, ZHAI Chengfeng, HE Yongsheng
- 201 Research advances in the quantitative analysis based on diffusion tensor imaging for grading and molecular typing of gliomas
HAN Xin, LU Jie
- 207 Advances in differentiating intracranial isolated fibromas from different grades of meningiomas based on diffusion-weighted imaging
WEI Lingzhen, ZENG Qingshi, CHEN Jinming, LI Meilin, LIU Jiahao, WANG Huaizhen
- 212 Progress of machine learning based on magnetic resonance imaging for orbital tumor research
WANG Yan, WU Xusha, HU Wenzhong, LI Yan, XI Yibin, YIN Hong
- 218 Research progress of conventional MRI characteristics in prognostic prediction of nasopharyngeal carcinoma
YANG Fan, LIN Meng, ZHANG Hongmei
- 224 Research progress of cardiac magnetic resonance feature tracking technique in evaluating myocardial strain in autoimmune rheumatic diseases
LIU Yuanchao, WANG Wenwen, GAO Yingying, QI Rongxing
- 229 Research progress of artificial intelligence in imaging evaluation of rheumatoid arthritis
LI Shenghu, WANG Lili