«ACİLDE»
MAGNETİK REZONANS GÖRÜNTÜLEME
NEREYE KADAR ?

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SAKARYA ÜNİVERSİTESİ TIP FAKÜLTESİ
ANTALYA-2013

SUNU PLANI

- MRG
- MRG’nin diğer tetkiklere göre avantajları
- MRG’nin acil serviste kullanım alanları
- Özet

MRG

- Su ve yağın, dolayısı ile de vücudumuzun büyük bir bölümünün yapısında mevcut bulunan (%63) **hidrojen atomlarının**, güçlü bir manyetik alan içerisinde, kendilerini rezonansa uğratacak bir **radyofrekans dalgası ile uyarılıp titreştirilmesinden elde olunan sinyallerin görüntüye dönüştürüldüğü** doku kontrast rezolüsyonu en yüksek **ileri radyolojik görüntüleme tekniğidir.**

MRG - Tarihçesi

- 1923 – İlk temellerin atıldığı yıl
- 1973 – İnsan vücudundaki ilk uygulama
- 1977 – Tüm vücut MRG
- 1980 – MRG'nin multiplanar özelliği ve ilk lezyon tanımı
- 1986 - Hızlı görüntüleme sekanslarının gelişimi
- 1987 – MR Anjiografi
- 1993 – Fonksiyonel MRG'nin kullanımı

MRG - Tarihçesi

- Tüm bu gelişim süreci MRG'yi sadece bir anatomik görüntüleme yöntemi olmaktan çıkarmış ve fonksiyonel bir inceleme yöntemi şekline dönüştürmüştür.

MRG - Avantajları

- Birincisi:
  - BT ve X-Ray iyonizan radyasyon nedeni ile uzun dönem karsinojen etki ortaya çıkartabilir.
  - MRG'ye ait kısa ve uzun dönem etkileri ???
  - Çocuk ve doğurganlık dönemindeki kadınlarda güvenle kullanılabilir.

MRG - Avantajları

- İkincisi:
  - Daha iyi kontrast çözünürlük ve doku ayrımı sağlar.
  - Bu yüzden; Beyin, omurilik, kemik iliği, kas, bağ, tendon, kalp, damarlar, abdominal solid organlar ve pelvik organların görüntülenmesinde tercih edilir.

MRG - Avantajları

- Üçüncüsü:
  - Anatomik yapılar arasındaki ilişkiyi en optimal ortaya koyan yöntemdir.

MRG – Acil Servisteki kullanım alanları

- Nöroradyoloji
- Acil servisteki en sık kullanım amaçları:
  - Spinal kord basısı şüphesi
  - Radyografik olarak gizli femur boyun kırığı veya intertrokanterik kırık
  - …….???

MRG – Spinal kord basılarında

Yüksek kontrast çözünürlük

TRAVMA VEYA MALİGNENSİ FARKETMEZ

MRG BT'den üstündür.

MRG – Spinal kord basılarında - Malignensi

- BT-Myelografi kullanılabilir. Ancak rahatsız edici bir prosedür olmasının yanı sıra sekonder enfeksiyon, kanama, kontrast reaksiyonu ve BOS alımına bağlı kompresyon artışına da neden olabilir.

- MRG: uygulama kolaylığı, düşük risk ve metastatik durumlarda tek kesitte çok sayıda lezyonu ortaya koyabilir.

MRG – Spinal kord basılarında - Travma

- MRG ve BT birbirini tamamlayıcıdır.
  - Direkt grafi ve BT kırık ve şüpheli spinal kord bası potansiyelini ortaya koyar.
  - MRG - ödemden tam kesiye kadar spinal korddaki etkilenimini direkt olarak ortaya koyar .

MRG – Gizli kalça kırıkları

- MRG direkt grafi veya BT'de görülemeyen bazı kırıkları saptayabilir;
  - Özellikle erken dönemde küçük veya minimal deplase kırıklar
  - Osteopenik kemiklerdeki kırıklar

MRG – Gizli kalça kırıkları

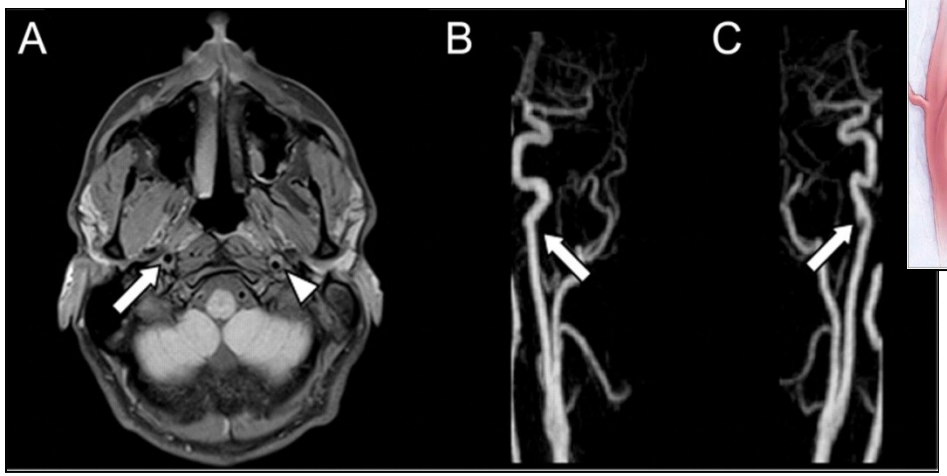
- Acil servise kalça ağrısı ile gelen
- Yüksek şüphe varlığı
- Diğer çalışmalara güvenemediğiniz durumlarda MRG.

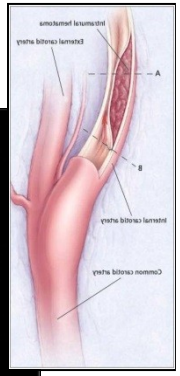
MRG - Serebral venöz sinüs trombozu

- MRG + Magnetik rezonans venografi kombinasyonu serebral venöz sinüs trombozu şüphesinde mükemmel sonuç verir.
- MRG
  - Sensitivitesi yüksek
  - Venöz sinüsteki kan akımı ile pıhtıyı ayırt edebilir.

MRG – Karotid ve vertebral arter diseksiyonu

- MRG ve MRG anjiografi karotis ve vertebral arterlerin diseksiyonu tanısında güvenilir ve geleneksel kontrast anjiografiye alternatif bir yaklaşımdır.
  - Geleneksel kontrast anjiografiye ait emboli, kanama riski ve iyotlu kontrast yan etkilerini taşımaz.



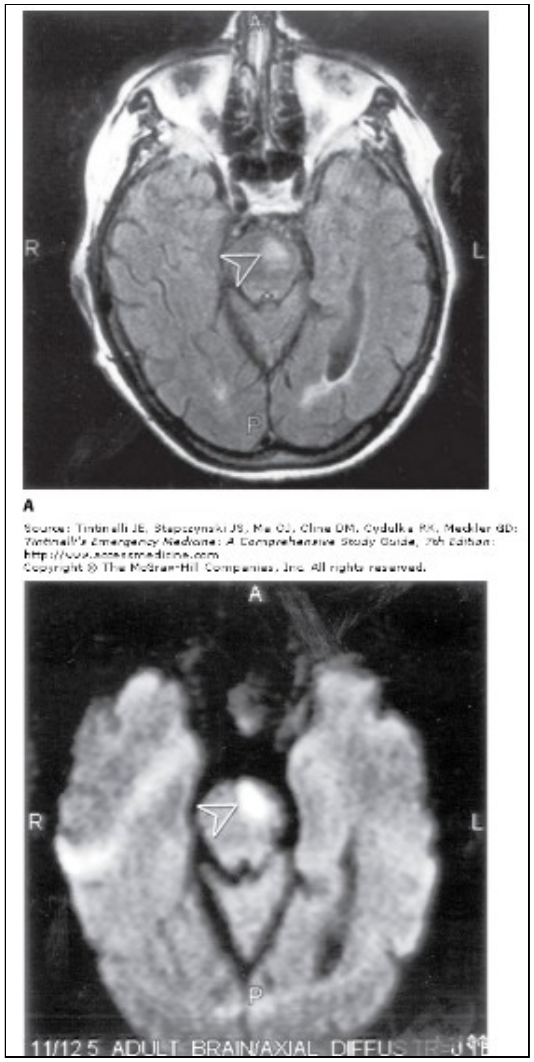


MRG - Akut serebrovasküler atak

- Trombolitik tedavinin kontrendikasyonlarını belirlemek için (Örn: intrakranial kitle…) bugüne kadar kontrastsız BT kullanılmış ve hala kullanılmaya da devam edilmektedir.

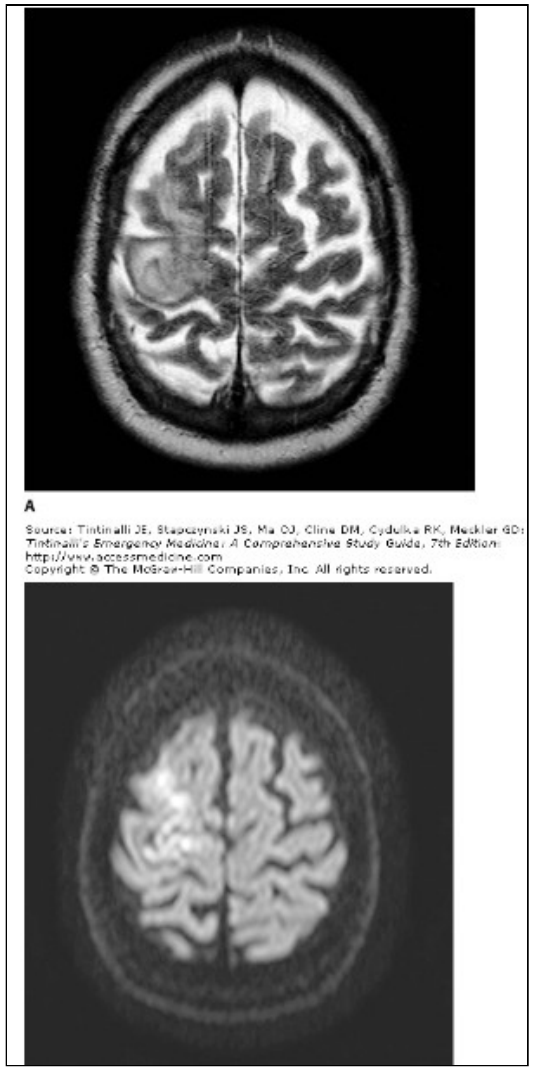
MRG – Akut serebrovasküler atak

- MRG ???
  - Multimodal MRG'nin akut hemorajik inmenin saptanmasında BT ile eşdeğer olduğu gösterilmiştir.
  - Posterior fossayı göstermede daha üstündür.



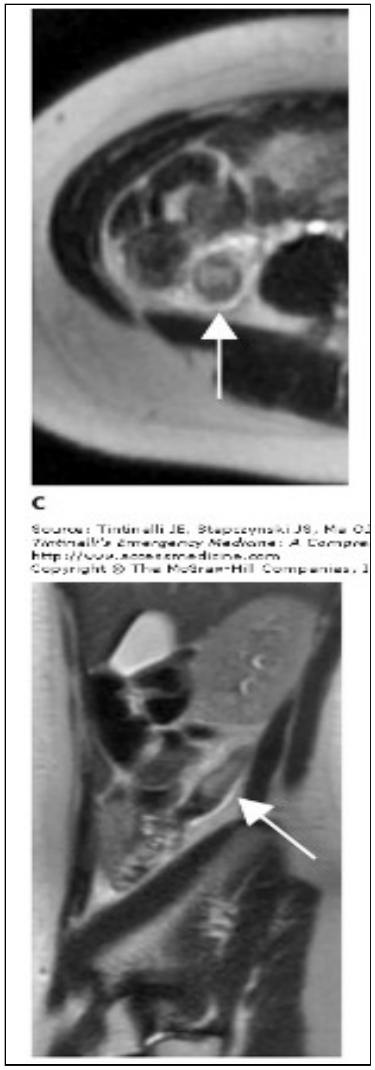
MRG – Akut serebrovasküler atak

- MRG ???
  - İskemik inmenin saptanmasında sensitivitesi yüksek olması nedeni ile tercih edilir. Özellikle difüzyon ağırlıklı çalışmalar dakikalar içerisinde iskemik inmeden kaynaklanan beyin parankimindeki anormallikleri saptayabilir.



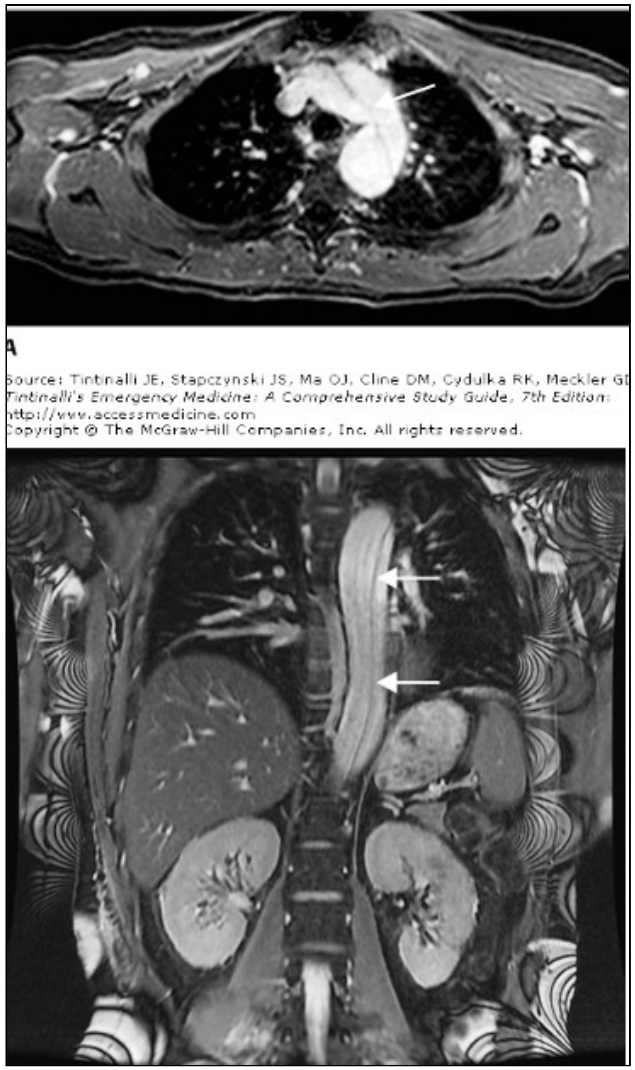
MRG – Gebelerde apandisit

- MRG gebelik sürecindeki apadisitin değerlendirmesinde acil serviste kullanılabilir.
- MRG NPV %100 ve doğruluk oranı %94
- IV kontrast gerektirmez.
- USG sonrası ikinci aşamada veya USG yoksa ilk tercih olarak düşünülebilir.



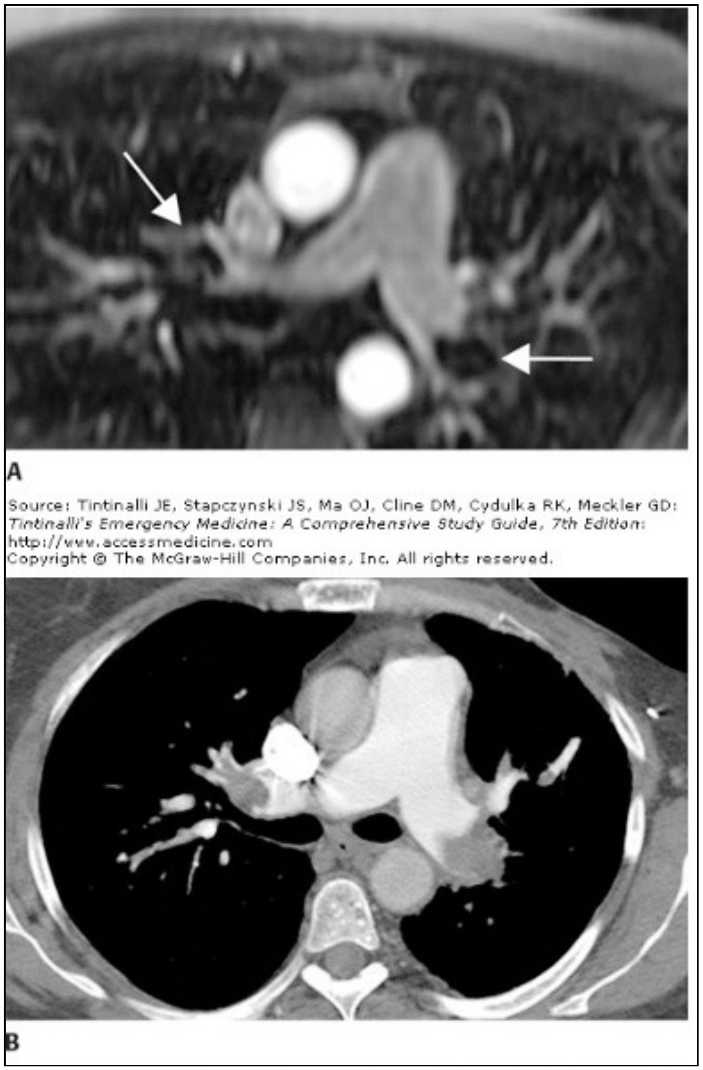
MRG – Aort diseksiyonu

- MRG aort diseksiyonu tanısı için son derece doğru bir tekniktir.
- Giriş yeri ve eşlik eden bulgular (yalancı lümen, etkilenen yan dallar ve aort regürjitasyonu) genellikle gösterilebilir.



MRG - Pulmomer emboli

- MRG; ana dallardaki emboliyi göstermede sorun yok ancak subsegmentel düzeylerdeki embolide düşük sensitiviteye sahiptir.
- BT ve ventilasyon perfüzyon sintigrafisi çekilemeyen hastalar için alternatif olarak düşünülebilir.



MRG – Diğer kullanım alanları

- TANI KOYMA ARZUSU nedeni ile daha önceden acil olarak kabul edilmeyen bazı endikasyonlar nedeni ile acil serviste MRG kullanımı artmaktadır.

MRG – Diğer kullanım alanları

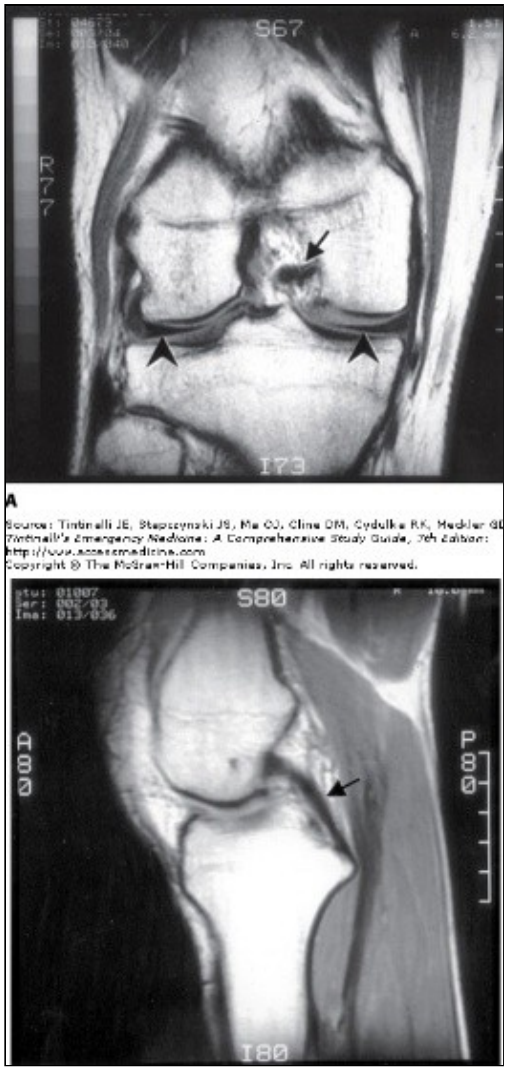
- Osteomyelit ve avasküler nekroz gibi kemik iliği görüntülenmesinde

- Stres ve görüntülenmesi zor el ve el bileği kırıklarında (skafoid ve lunat kırıklar gibi…)

MRG – Diğer kullanım alanları

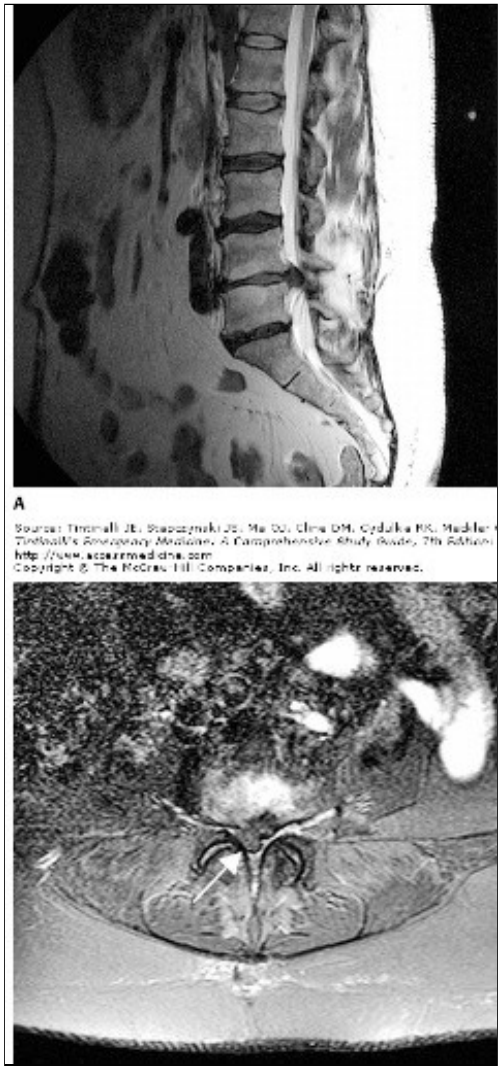
MRG – Diğer kullanım alanları

- Kas yırtığı, tendon veya bağ kopmaları, sinir hasarı, kanama, enflamasyon ve ödem gibi yumuşak doku yaralanmalarında kullanılabilir.



MRG – Diğer kullanım alanları

- Disk hernisi



MRG – Kontrendikasyonlar

- İmplante cihazlar ve yabancı cisimler:
  - Metal içerikli cihazlar – klipsler ve kohlear implantlar
  - Kalp pili
  - Pulmoner arter kateterleri
  - Pacemakır ve implante kardiyak defibrilatörler
- Klinik olarak unstabil hastalar
- Gebeler
  - Bilinen ve belgelenmiş bir teratojenik etkisi yok
  - Öneri gebelik süresince yapılmaması
  - 2-20 haftalar arası iyonize radyasyona tercih edilebilir.
- Hasta uyumsuzluğu

MRG – Özet

Spinal kord basısı şüphesi

Radyografik olarak gizli femur boyun kırığı veya intertrokanterik kırık

Serebral venöz sinus trombozu

Karotis ve vertebral arter diseksiyonu

Serebrovasküler atak

Gebelerde apandisit

Aort diseksiyonu

Pulmoner emboli

Kemik iliği

Osteomyelit

El – el bileği kırıkları

Disk hernisi

Biz ne yapıyoruz/yapmışız

Tarama sonuçları (408 kayıt bulundu. 408 tanesi görüntülenmektedir.) Ara:

Tez No	Yazar	Tez Adı (Orjinal/Çeviri)	Yıl	Konu
165377	ENGİN ÖZAKIN	Periferikve santral vertigo ayırımında odyolojik ve magnetik rezonans görüntülemenin acil serviste kullanımının değerliliği *Value of magnetic resonance imaging and audiology in emergency room in differential diagnosis of peripheral and central vertigo*	2005	İlk ve Acil Yardım
308168	MUSTAFA ŞAHİN	Serebrovasküler hastalıkların retrospektif analizi *Beyin damar hastaliklarinin geriye dönük incelenmesi*	2012	Nöroloji ; İlk ve Acil Yardım
316788	EBRU ÜNAL AKOĞLU	Acil servise baş dönmesi şikayeti ile başvuran periferik vertigo hastalarinda ayirici tanida manyetik rezonans görüntülemenin tanisal yeri *Utility of magnetic resonance imaging in the differential diagnosis of peripheral vertigo patients admitted to the emergency department with the complaint of dizziness*	2012	Nöroloji ; Radyoloji ve Nükleer Tıp ; İlk ve Acil Yardım
319244	SEVGİ YUMRUTEPE	Acil serviste dinamik bilgisayarlı tomografi ile pulmoner emboli tanısı konulan hastaların manyetik rezonans görüntüleme bulgularının değerlendrilmesi *The evaluation of findings thorax diffusion magnetic resonance imaging diagnosis of patients diagnosed with pulmonary embolism with computed tomography in the emergency service*	2012	Göğüs Hastalıkları ; İlk ve Acil Yardım
297253	CANAN AKMAN	Acil serviste nörogörüntüleme yapılmış başağrısı olgularının değerlendirilmesi *Evaluation of the patients who have neuroimaging in the emergency room for headache*	2011	İlk ve Acil Yardım

Value of Magnetic Resonance Imaging and Audiology in the Emergency Department in Differential Diagnosis of Peripheral and Central Vertigo

Periferik ve Santral Vertigo Ayırımında Odyoloji ve Manyetik Rezonans Görüntülemenin Acil Serviste Kullanımının Değeri

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Geliş Tarihi/*Received:* 24.08.2010
Kabul Tarihi/*Accepted:* 11.06.2011

ABSTRACT Objective: Vertigo is a common complaint in the emergency room. Vertigo can be central or peripheral in origin and it is important for an emergency physician to make a correct differential diagnosis. The purpose of our study was to emphasize the role of cranial magnetic resonance imaging (MRI) and audiological tests in differential diagnosis of patients who present with vertigo to the emergency room. **Material and Methods:** Fifty patients (31 female, 19 male, mean age 50.84 years) with vertigo who were admitted to the Hacettepe University Faculty of Medicine Emergency Room (ER) between 01.10.2004 and 31.01.2005 were included in the study. Physical and neurological examinations of all patients were performed by senior residents and all patients were evaluated by Ear Nose Throat specialists. Audiologic and vestibular tests and MRI with 3T (Tesla) magnetic field power were performed in all patients. **Results:** Among 29 patients with normal neurological examination, only 3 (10.3%) had lesions on MRI. MRI scans revealed lesions suggesting central vertigo etiology in six (18.2%) patients out of 33 with abnormal audiological test suggesting peripheral vestibulopathy. **Conclusion:** In conclusion, in our prospective study, urgent cranial MRI technique in patients presenting to the emergency room with vertigo may reveal significant findings regarding the differential diagnosis and concomitant pathologies. However, meticulous neurological examination can exclude central vertigo in the majority of the patients.

Güncel literatürde neler var ???

EL BİLEĞİ

Injury. 2012 Oct;43(10):1732-42. doi: 10.1016/j.injury.2012.06.028. Epub 2012 Jul 21.

A new definition of wrist sprain necessary after findings in a prospective MRI study.

Bergh TH, Lindau T, Bernardshaw SV, Behzadi M, Soldal LA, Steen K, Brudvik C.

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Abstract

INTRODUCTION: Wrist injuries with negative X-rays are diagnosed as acute wrist sprains. The prognosis is usually good, but some patients suffer from long-lasting pain and reduced wrist function, probably due to missed diagnosis followed by inappropriate treatment. The aim of this study was to investigate acute wrist sprains with MRI to detect the pathoanatomy of the injury.

PATIENTS AND METHODS: This prospective magnetic resonance imaging (MRI) study included patients between 18 and 49 years, who attended the Accident and Emergency Department (A&E) Bergen, Norway, after sustaining an acute wrist trauma within the previous week. Initial X-rays of the wrist were normal. MRI was done within a median of 1 day (range 0-31 days) after the trauma, 80% within 4 days. The study period lasted from 5 November 2009 to 4 November 2010.

RESULTS: A total of 155 acute MRIs were done, out of which 30 were completely normal. Patients with positive MRI had a median of two (range 0-8) pathological findings. We found 54 fractures and 56 bone bruises, mostly located to the radius followed by the scaphoid, the triquetrum, the capitate and the lunate. There were 73 soft-tissue injuries, which included 15 injuries to the triangular fibrocartilage complex (TFCC) and five scapho-lunate (SL) ligament lesions.

CONCLUSIONS: Wrist sprain is an inaccurate diagnosis. In four out of five patients with normal X-rays, MRI identified pathological findings and a large variety of injuries in different structures. We suggest that wrist sprain should be defined as "occult partial or complete soft tissue (ligament, tendon, muscle) or bony injury in relation to a trauma with negative X-ray". The MRI findings led to a more differentiated treatment in more than a third of the patients. We recommend that MRI should be considered as a part of an early investigation, especially when the wrist pain does not settle within the first couple of weeks.

KALÇA

AJR Am J Roentgenol. 2012 Jun;198(6):W581-8. doi: 10.2214/AJR.11.7258.

Abbreviated MRI for patients presenting to the emergency department with hip pain.

Khurana B, Okanobo H, Ossiani M, Ledbetter S, Al Dulaimy K, Sodickson A.

Department of Radiology, Brigham and Women's Hospital, Boston, MA 02115, USA. bkhurana@partners.org

Abstract

OBJECTIVE: The objective of our study was to assess the diagnostic performance of two abbreviated hip MRI protocols--coronal STIR images only and coronal STIR with coronal T1-weighted images--as compared with a full hip MRI protocol in patients presenting to the emergency department (ED) with hip pain and negative radiographic findings.

MATERIALS AND METHODS: The cohort included 385 patients (277 females, 108 males; mean age, 61 years; age range, 16-99 years) who underwent MRI within 1 month of negative radiographs obtained for ED evaluation of hip pain between January 2000 and March 2009. MR examinations were graded independently by two musculoskeletal fellowship-trained emergency radiologists for detection of fracture, avascular necrosis (AVN), and muscle injury in three subsets: coronal STIR images only; coronal STIR images and coronal T1-weighted images; and the full examination.

RESULTS: MRI detected findings suspicious for fracture in 42% (162/385) of patients, for AVN in 9% (33/385), and for muscle injury in 35% (134/385). The sensitivity and specificity of STIR alone in raising concern for fracture was 99% (220/223) for both readers, with small incremental benefits of adding coronal T1-weighted images. For AVN, specificity was 100% (28/28) with STIR alone, but the addition of coronal T1-weighted images provided substantial benefit by increasing sensitivity from 85% (28/33) to 97% (32/33). For muscle injury, sensitivity and specificity exceeded 95% (128/134) for both abbreviated examinations.

CONCLUSION: An abbreviated MRI protocol including coronal STIR and coronal T1-weighted images has high sensitivity and specificity for fracture, AVN, and muscle injury in ED patients presenting with hip pain and negative radiographs.

SEREBROVASKÜLER ATAK

Ann Emerg Med. 2013 Jan;61(1):62-71.e1. doi: 10.1016/j.annemergmed.2012.01.013. Epub 2012 Mar 3.

Does diffusion-weighted imaging predict short-term risk of stroke in emergency department patients with transient ischemic attack?

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Abstract

STUDY OBJECTIVE: The optimal diagnostic evaluation for establishing the risk of stroke among patients presenting to the emergency department (ED) with a transient ischemic attack has not been determined. The objective of this review is to assess the ability of diffusion-weighted magnetic resonance imaging (MRI) to predict the short-term risk of stroke.

METHODS: MEDLINE, EMBASE, and the Cochrane Library were queried to identify studies examining the use of diffusion-weighted MRI in patients with classically defined transient ischemic attack. The primary outcome measure was the rate of stroke at 48 hours. Two reviewers determined study eligibility and extracted data. Quality was assessed according to published recommendations for the design and reporting of prognostic studies.

RESULTS: One thousand six hundred ninety-six abstracts were identified and 35 articles underwent full-text review. Six cohort studies met the inclusion criteria but were limited by selection bias and differences in duration and completeness of follow-up. Results were not consistent across studies, with 5 reporting higher rates of stroke among diffusion-weighted MRI-positive patients, whereas 1 study reported higher rates in diffusion-weighted MRI-negative patients. Among the 4 studies (N=629 patients) reporting 48-hour outcomes, the risk of stroke ranged from 0% to 2.9% in patients with negative diffusion-weighted MRI findings compared with 0% to 9% among those with positive diffusion-weighted MRI results.

CONCLUSION: Studies of variable quality, consistency, and precision suggest that diffusion-weighted MRI may identify patients at sufficiently low risk to warrant ED discharge and close outpatient follow-up.

KARBONMONOKSİT ZEHİRLENMESİ

Chudoku Kenkyu. 2013 Mar;26(1):54-60.

[A case of carbon monoxide poisoning with delayed encephalopathy assessed by magnetic resonance imaging].

[Article in Japanese]

Seino K, Hayashida A, Iseki K.

Department of Emergency and Critical Care Medicine, Yamagata University, School of Medicine.

Abstract

A 21-year-old man attempted suicide by burning charcoal in a car for more than one day and was admitted to a regional hospital. On admission, his blood carboxyhemoglobin concentration was 4.4%. The patient was transferred to our emergency department because of suspected carbon monoxide poisoning. Hyperbaric oxygen therapy (HBO) was performed 5 times over 3 days. Fluid-attenuation inversion recovery (FLAIR) and diffusion-weighted (DWI) magnetic resonance imaging (MRI) performed on day 3 showed high signal-intensity lesions in the cerebral white matter. Additional HBO was performed once per day until day 16. Wecheler Memory Scale-Reviced (WMS-R) and Mini-Mental State Examination (MMSE) performed on day 17 showed his cognitive impairment. He gradually recovered the cognitive function and was discharged from the hospital without neurological sequelae on day 49. Delayed encephalopathy after acute carbon monoxide poisoning with dementia, mental impairment, and psychosis is a serious complication. Hyperintensity in FLAIR and DWI MRI predicts delayed encephalopathy and indicates cellular edema and demyelination of the white matter. One of the risk factors is prolonged carbon monoxide exposure. This case suggests that the patient, who was exposed to carbon monoxide for many hours, was at a high risk of delayed encephalopathy despite the low blood carboxyhemoglobin concentration and therefore must be monitored using MRI.

CO zehirlenmesinde ensefalopati takibinde MRG kullanılabilir.

KARDİYOVASKÜLER

Br J Radiol. 2012 Jul;85(1015):e274-8. doi: 10.1259/bjr/52001979. Epub 2011 Dec 13.

Assessment of myocardial infarction by CT angiography and cardiovascular MRI in patients with cocaine-associated chest pain: a pilot study.

Paraschin K, Guerra De Andrade A, Rodrigues Parga J.

Cardiovascular CT and Magnetic Resonance Lab, Heart Institute (InCor), University of São Paulo, São Paulo, Brazil. karenparaschin@yahoo.com.br

Abstract

OBJECTIVES: Cocaine is a commonly used illicit drug that leads to the most emergency department (ED) visits. Chest pain is the most common presentation, reported in 40% of patients. Our aim was to evaluate the incidence of previous myocardial infarction among young cocaine users (18-40 years) with cocaine-associated chest pain by the assessment of myocardial fibrosis by cardiovascular MRI. Second, we also intended to evaluate the coronary tree by CT angiography (CTA).

METHODS: 24 cocaine users (22 males) who frequently complained about cocaine-associated chest pain underwent CTA and cardiovascular MRI. Mean age of patients was 29.7 years and most of them (79%) had frequently used inhalatory cocaine.

RESULTS: The calcium score turned out to be positive in only one patient (Agatston=54). Among the coronary segments evaluated, only one patient had calcified plaques at the anterior descending coronary artery (proximal and medium segments). Assessment of regional ventricular function by the evaluation of 17 segments was normal in all patients. None of the patients showed myocardial delayed enhancement, indicative of myocardial fibrosis. CTA therefore confirmed the low cardiovascular risk of these patients, since most of them (96%) had no atherosclerosis detected by this examination. Only one patient (4%) had coronary atherosclerosis detected, without significant coronary stenosis.

CONCLUSION: Cardiovascular MR did not detect the presence of delayed enhancement indicative of myocardial fibrosis among young cocaine users with low cardiovascular risk who had complained of cocaine-associated chest pain.

İNTESTİNAL HADİSELER
İnflamatuar bağırsak hastalıkları, neoplazm ve yapısal anormallikler

Images in...

Use of MRI to detect duodenal lesion caused by eosinophilic duodenitis

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[2]Department of Radiology, Wexham Park Hospital, Berkshire, UK
[3]Department of Gastroenterology, Wexham Park Hospital, Berkshire, UK

DESCRIPTION

A man in his mid-20s was admitted to the A&E department with melaena and lower abdominal pain. He had been diagnosed with dyspepsia and duodenitis 4 years back.

Haematological investigation revealed microcytic hypochromic anaemia with haemoglobin of 7.7 g/dl and a mean corpuscular volume of 75 fl while other values (including eosinophils) were within normal range. He received blood transfusion and

Learning points

- MRI enterography is an imaging·technique for small bowel disease that is increasingly more popular than CT or barium fluoroscopic examination because of the lack of ionising radiation exposure; improved contrast of the endoluminal, mural and extramural soft tissues.[1]
- MRI enterography can also be used to diagnose and monitor activity of inflammatory bowel diseases, identify neoplasms and structural abnormalities.[2]

PENİL FRAKTÜR

J Urol. 1996 Jun;155(6):1924-7.

The value of magnetic resonance imaging in the diagnosis of suspected penile fracture with atypical clinical findings.

Fedel M, Venz S, Andreessen R, Sudhoff F, Loening SA.

Department of Urology, Virchow-Klinikum/Charité, Humoldt-University, Berlin, Germany.

Abstract

PURPOSE: We studied the use of magnetic resonance imaging (MRI) in the diagnosis of suspected penile fracture.

MATERIALS AND METHODS: Penile fracture diagnosis was based on classic history and typical physical signs in 8 patients who were treated surgically without any further diagnostic procedure. Sonography, cavernosography and MRI were performed in 4 patients with equivocal findings.

RESULTS: Only MRI identified rupture of the corpus cavernosum in all 4 cases.

CONCLUSIONS: MRI is the most accurate imaging procedure when penile fracture is suspected but clinical findings are unusual.

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The impracticality of MRI for the diagnosis of atypical penile fracture in the emergency setting.

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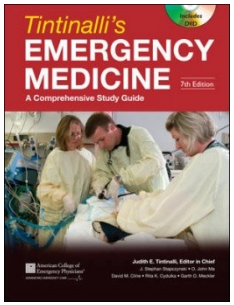
Abstract

We report the case of a patient who presented to the emergency department with a history suspicious for penile fracture without typical physical exam findings. A small penile fracture was present on MRI, but the diagnosis was missed, and surgery was withheld owing to this misinformation. Despite its technical accuracy, MRI may be impractical for the diagnosis of penile fracture in the emergency setting.

KEYWORDS: Trauma, imaging, CT/MRI, management, emergency department management, uro-genital



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TEŞEKKÜRLER