

Practice Advisory on Anesthetic Care for Magnetic Resonance Imaging: An Updated Report
American Society of Anesthesiologists

Bibliography in Alphabetical Order

1. Achenbach S, Moshage W, Diem B, Bieberle T, Schibgilla V, Bachmann K: Effects of magnetic resonance imaging on cardiac pacemakers and electrodes. *Am Heart J* 1997; 134:467-473
2. Alagona P Jr., Toole JC, Maniscalco BS, Glover MU, Abernathy GT, Abernathy GT, Prida XA: Nuclear magnetic resonance imaging in a patient with a DDD pacemaker. *Pacing Clin Electrophysiol* 1989; 12:619-620
3. Anfinson OG, Berntsen RF, Aass H, Kongsgaard E, Amlie JP: Implantable cardioverter defibrillator dysfunction during and after magnetic resonance imaging. *Pacing Clin Electrophysiol* 2002; 25:1400-1402
4. Anonymous: ECRI hazard report: patient death illustrates the importance of adhering to safety precautions in magnetic resonance environments. *Health Devices* 2001; 30:311-314
5. Anonymous: ECRI: The safe use of equipment in the magnetic resonance environment. *Health Devices* 2001; 30:421-444
6. Applebaum E, Valvassori G: Further studies on the effects of magnetic resonance fields on middle ear implants. *Ann Otol Rhinol Laryngol* 1990; 99:801-804
7. Arsenaault TM, King BF, Marsh JW Jr., Goodman JA, Weaver AL, Wood CP, Ehman RL: Systemic gadolinium toxicity in patients with renal insufficiency and renal failure: retrospective analysis of an initial experience. *Mayo Clin Proc* 1996; 71:1150-1154
8. Avery JE: Loss prevention case of the month. Not my responsibility! *J Tenn Med Assoc* 1988; 81:523-524
9. Baker KB, Nyenhuis JA, Hrdlicka G, Rezai AR, Tkach JA, Shellock FG: Neurostimulation systems: assessment of magnetic field interactions associated with 1.5- and 3-Tesla MR systems. *J Magn Reson Imaging* 2005; 21:72-77
10. Barnett GH, Ropper AH, Johnson KA: Physiological support and monitoring of critically ill patients during magnetic resonance imaging. *J Neurosurg* 1988; 68:246-250
11. Barrafato D, Henkelman RM: Magnetic resonance imaging and surgical clips. *Can J Surg* 1984; 27:509-512
12. Bashein G, Syrory B: Burns associated with pulse oximetry during magnetic resonance imaging. *Anesthesiology* 1991; 75:382-383
13. Battin M, Maalouf EF, Counsell S, Herligy A, Hall A, Azzopardi D, Edwards AD: Physiologic stability of preterm infants during magnetic resonance imaging. *Early Hum Dev* 1998; 52:101-110
14. Becker RL, Forfray JF, Teitelbaum GP, Bradley WG Jr, Jacobs JB, Wacaser L, Rieman RL: MR imaging in patient with intracranial aneurysm clips. *AJNR Am J Neuroradiol* 1988; 9:885-889
15. Beebe DS, Tran P, Bragg M, Stillman A, Truwitt C, Belani KG: Trained nurses can provide safe and effective sedation for MRI in pediatric patients. *Can J Anaesth* 2000; 47:205-210

16. Bhidayasiri R, Bronstein JM, Sinha S, Krahl SE, Ahn S, Behnke EJ, Cohen MS, Frysinger R, Shellock FG: Bilateral neurostimulation systems used for deep brain stimulation: in vitro study of MRI-related heating at 1.5 T and implications for clinical imaging of the brain. *Magn Reson Imaging* 2005; 23:549-555
17. Bloomfield EL, Masaryk TJ, Caplin A, Obuchowski NA, Schubert A, Hayden J, Ebrahim ZY, Ruggieri PM, Goske MJ, Ross JS: Intravenous sedation for MR imaging of the brain and spine in children: pentobarbitol versus propofol. *Radiology* 1993; 186:93-97
18. Bluemke DA, Breiter SN: Sedation procedures in MR imaging: safety, effectiveness, and nursing effect on examinations. *Radiology* 2000; 216:645-652
19. Bonnett CA, Elson JJ, Fogoros RN: Accidental deactivation of the automatic implantable cardioverter defibrillator. *Am Heart J* 1990; 120:696-697
20. Broome DR, Girguis MS, Baron PW, Cottrell AC, Kjellin I, Kirk GA: Gadodiamide-associated nephrogenic systemic fibrosis: why radiologists should be concerned. *AJR Am J Roentgenol* 2007; 188:586-592
21. Brown MA, Carden JA, Coleman RE, McKinney R, Spicer LD: Magnetic field effects on surgical ligation clips. *Magn Reson Imaging* 1987; 5:443-453
22. Brown TR, Goldstein B, Little J: Severe burns resulting from magnetic resonance imaging with cardiopulmonary monitoring. Risks and relevant safety precautions. *Am J Phys Med Rehabil* 1993; 72:166-167
23. Bryan YF, Hoke LK, Taghon TA, Nick TG, Wang Y, Kennedy SM, Furstein JS, Kurth CD: A randomized trial comparing sevoflurane and propofol in children undergoing MRI scans. *Paediatr Anaesth* 2009; 19:672-681
24. Bryan YF, Templeton TW, Nick TG, Szafran M, Tung A: Brain magnetic resonance imaging increases core body temperature in sedated children. *Anesth Analg* 2006;102:1674-1679
25. Buchli R, Boesiger P, Meier D: Heating effects on metallic implants by MRI examination. *Magn Reson Med* 1988; 7:255-261
26. Carmichael DW, Pinto S, Limousin-Dowsey P, Thobois S, Allen PJ, Lemieux L, Yousry T, Thornton JS: Functional MRI with active, fully implanted, deep brain stimulation systems: safety and experimental confounds. *Neuroimage* 2007; 37:508-517
27. Chaljub G, Kramer LA, Johnson RF III, Singh H, Crow WN: Projectile cylinder accidents resulting from the presence of ferromagnetic nitrous oxide or oxygen tanks in the MR suite. *AJR Am J Roentgenol* 2001;177:27-30
28. Cho JE, Kim WO, Chang DJ, Choi EM, Oh SY, Kil HK: Titrated propofol induction vs. continuous infusion in children undergoing magnetic resonance imaging. *Acta Anaesthesiol Scand* 2010; 54:453-457
29. Chou C-K, McDougall JA, Chan KW: RF heating of implanted spinal fusion stimulator during magnetic resonance imaging. *IEEE Trans Biomed Eng* 1997; 44:367-372
30. Colletti PM: Size "H" oxygen cylinder: accidental MR projectile at 1.5 Tesla. *J Magn Reson Imaging* 2004; 19:141-143
31. Coman JA, Martin ET, Sandler DA, Thomas JR: Implantable cardiac defibrillator interactions with magnetic resonance imaging at 1.5 Tesla. *J Am Coll Cardiol* 2004; 43:138A
32. Connor L, Burrows PE, Zurakowski D, Bucci K, Gagnon DA, Mason KP: Effects of IV pentobarbital with and without fentanyl on end-tidal carbon dioxide levels during deep sedation. *AJR Am J Roentgenol* 2003; 181:1691-1694

33. Cox RG, Levy R, Hamilton MG, Ewen A, Farran P, Neil SG: Anesthesia can be safely provided for children in a high-field intraoperative magnetic resonance imaging environment. *Paediatr Anaesth* 2011; 21:454-458
34. Crane BT, Gottschalk B, Kraut M, Aygun N, Niparko JK: Magnetic resonance imaging at 1.5 T after cochlear implantation. *Otol Neurotol* 2010; 31:1215-1220
35. Davis PL, Crooks L, Arakawa M, McRii R, Kaufman L, Margulis AR: Potential hazards of NMR imaging: heating effects of changing magnetic fields and RF fields on small metallic implants. *AJR Am J Roentgenol* 1981; 137:857-860
36. De Andres J, Valía JC, Cerda-Olmedo G, Quiroz C, Villanueva V, Martinez-Sanjuan V, de Leon-Casasola O: Magnetic resonance imaging in patients with spinal neurostimulation systems. *Anesthesiology* 2007; 106:779-786
37. De Sanctis Briggs V: Magnetic resonance imaging under sedation in newborns and infants: a study of 640 cases using sevoflurane. *Paediatr Anaesth* 2005; 15:9-15
38. Delvi MB, Samarkandi A, Zahrani T, Faden A: Recovery profile for magnetic resonance imaging in pediatric daycase--sevoflurane vs. isoflurane. *Middle East J Anesthesiol* 2007; 19:205-211
39. Dempsey MF, Condon B: Thermal injuries associated with MRI. *Clin Radiol* 2001; 56:457-465
40. Dharnidharka VR, Wesson SK, Fennel RS: Gadolinium and nephrogenic fibrosing dermopathy in pediatric patients. *Pediatr Nephrol* 2006; 22:1395
41. Dujovny M, Kossovsky N, Kossowsky R, Valdivia R, Suk JS, Diaz FG, Berman K, Cleary W: Aneurysm clip motion during magnetic resonance imaging: in vivo experimental study with metallurgical factor analysis. *Neurosurgery* 1985; 17:543-548
42. Dunn V, Coffman CE, McGowan JE, Ehrhardt JC: Mechanical ventilation during magnetic resonance imaging. *Magn Reson Imaging* 1985; 3:169-172
43. Edwards MB, Taylor KM, Shellock FG: Prosthetic heart valves: evaluation of magnetic field interaction, heating and artifacts at 1.5 T. *J Magn Reson Imaging* 2000;12:363-369
44. Engler MB, Engler MM: The effects of magnetic resonance imaging in intravenous infusion devices. *West J Med* 1985; 143:329-332
45. Erlebacher JA, Cahill PT, Pannizzo F, Knowles JR: Effect of magnetic resonance imaging on DDD pacemakers. *Am J Cardiol* 1986; 57:437-440
46. Ferris NJ, Kavvoudias H, Thiel C, Stuckey S: The 2005 Australian MRI safety survey. *AJR Am J Roentgenol* 2007; 188:1388-1394
47. Fetter J, Aram G, Holmes DR Jr., Gray JE, Hayes DL: The effects of nuclear magnetic resonance imagers on external and implantable pulse generators. *Pacing Clin Electrophysiol* 1984; 7:720-727
48. Fiek M, Remp T, Reithmann C, Steinbeck G: Complete loss of ICD programmability after magnetic resonance imaging. *Pacing Clin Electrophysiol* 2000; 27:1002-1004
49. Finelli DA, Rezai AR, Ruggieri PM, Tkach JA, Nyenhuis JA, Hrdlicka G, Sharan A, Gonzalez-Martinez J, Stypulkowski PH, Shellock FG: MR imaging-related heating of deep brain stimulation electrodes: in vitro study. *Am J Neuroradiol* 2002; 23:1795-802
50. Fogel MA, Weinberg PM, Parave E, Harris C, Montenegro L, Harris MA, Concepcion M: Deep sedation for cardiac magnetic resonance imaging: a comparison with cardiac anesthesia. *J Pediatr* 2008; 152:534-259

51. Fontain JM, Mohammed FB, Gottlieb C, Callans DJ, Marchlinski FE: Rapid ventricular pacing in a pacemaker patient undergoing magnetic resonance imaging. *Pacing Clin Electrophysiol* 1998; 21:1336-1339
52. Foran AM, Fitzpatrick JA, Allsop J, Schmitz S, Franklin J, Pamboucas C, O'Regan D, Hanjal JV, Edwards D: Three-tesla cardiac magnetic resonance imaging for preterm infants. *Pediatrics* 2007; 120:78-83
53. Gangarosa RE, Minnis JE, Nobbe J, Praschan D, Genberg RW: Operational safety issues in MRI. *Magn Reson Imag* 1987;5:287-292
54. Garcia-Bolao I, Albaladejo V, Benito A, Alegria E, Zubieta JL: Magnetic resonance imaging in a patient with a dual-chamber pacemaker. *Acta Cardiol* 1998; 53:33-35
55. Gegauff AF, Laurell KA, Thavendrarajah A, Rosenstiel SF: A potential MRI hazard: forces on dental magnet keepers. *J Oral Rahab* 1990; 17:403-410
56. Gemma M, de Vitis A, Baldoli C, Calvi MR, Blasi V, Scola E, Nobile L, Iadanza A, Scotti G, Beretta L: Functional magnetic resonance imaging (fMRI) in children sedated with propofol or midazolam. *J Neurosurg Anesthesiol* 2009; 21:253-258
57. Gimbel JR, Bailey SM, Tchou PJ, Ruggieri PM, Wilcox EL: Strategies for the safe magnetic resonance imaging of pacemaker-dependent patients. *Pacing Clin Electrophysiol* 2005; 28:1041-1046
58. Gimbel JR, Johnson D, Levine PA, Wilkoff BL: Safe performance of magnetic resonance imaging on five patients with permanent cardiac pacemakers. *Pacing Clin Electrophysiol* 1996; 19:913-919
59. Gimbel JR, Kanal E, Schwartz KM, Wilkoff BL: Outcome of magnetic resonance imaging (MRI) in selected patients with implantable cardioverter defibrillators (ICDs). *Pacing Clin Electrophysiol* 2005; 28:270-273
60. Gimbel JR, Lorig RJ, Wilkoff BL: Safe magnetic resonance imaging of pacemaker patients. *J Am Coll Cardiol* 1995; 25:11A
61. Gimbel JR, Trohman RL, Lindsay WC, Clair WK, Wilkoff BL: Strategies for the safe performance of magnetic resonance imaging in selected ICD patients. *Pacing Clin Electrophysiol* 2002; 25:618
62. Girshin M, Shapiro V, Rhee A, Ginsberg S, Inchiosa MA Jr: Increased risk of general anesthesia for high-risk patients undergoing magnetic resonance imaging. *J Comput Assist Tomogr* 2009; 33:312-315
63. Greenberg SB, Faerber EN, Aspinall CL, Adams RC: High-dose chloral hydrate sedation for children undergoing MR imaging: safety and efficacy in relation to age. *AJR Am J Roentgenol* 1993; 161:639-641
64. Grobner T: Gadolinium - a specific trigger for the development of nephrogenic fibrosing dermopathy and nephrogenic systemic fibrosis? *Nephrol Dial Transplant* 2006; 21:1104-1108
65. Groendaal F, Leusink C, Nijenhuis JA, Janssen MJ: Neonatal life support during magnetic resonance imaging. *J Med Engin Technol* 2002; 26:71-74
66. Hall SC, Stevenson GW, Suresh S: Burn associated with temperature monitoring during magnetic resonance imaging. *Anesthesiology* 1992; 76:152
67. Hartnell GG, Spence L, Hughe LA, Cohen MC, Saouf R, Buff B: Safety of MR imaging in patients who have retained metallic materials after cardiac surgery. *Am J Roentgenol* 1997; 168:1157-1159

68. Hassan NE, Betz BW, Cole MR, Wincek J, Reischman D, Sanfilippo DJ, Winterhalter-Rzeszutko KM, Kopec JS: Randomized controlled trial for intermittent versus continuous propofol sedation for pediatric brain and spine magnetic resonance imaging studies. *Pediatr Crit Care Med* 2011; 12:e262-e265
69. Hayes DL, Holmes DR Jr., Gray JE: Effect of 1.5 Tesla nuclear magnetic resonance imaging scanner on implanted permanent pacemakers. *J Am Coll Cardiol* 1987; 10:782-786
70. Heard C, Burrows F, Johnson K, Joshi P, Houck J, Lerman J: A comparison of dexmedetomidine-midazolam with propofol for maintenance of anesthesia in children undergoing magnetic resonance imaging. *Anesth Analg* 2008; 107:1832-1839
71. Heatlie G, Pennell DJ: Cardiovascular magnetic resonance at 0.5T in five patients with permanent pacemakers. *J Cardiovasc Magn Reson* 2007; 9:15-19
72. Heller J, Brackman D, Tucci D, Nyenhuis J, Chou C: Evaluation of MRI compatibility of the modified nucleus multichannel auditory brainstem and cochlear implants. *Am J Otol* 1996; 17:724-729
73. Heng Vong C, Bajard A, Thiesse P, Bouffet E, Seban H, Marec Bérard P: Deep sedation in pediatric imaging: efficacy and safety of intravenous chlorpromazine. *Pediatr Radiol* 2012; 42:552-561
74. Henneberg S, Hok B, Wiklund L, Sjodin G: Remote auscultatory patient monitoring during magnetic resonance imaging. *J Clin Monit* 1992; 8:37-43
75. Holmes DR Jr., Hayes DL, Gray JE, Merideth J: The effects of magnetic resonance imaging in implantable pulse generators. *Pacing Clin Electrophysiol* 1986; 9:360-370
76. Holshouser BA, Hinshaw DB, Shellock FG: Sedation, anesthesia, and physiologic monitoring during MR imaging: evaluation of procedures and equipment. *J Magn Reson Imaging* 1993; 3:553-558
77. Hubbard AM, Markowitz RI, Kimmel B, Kroger M, Bartko MB: Sedation for pediatric patients undergoing CT and MRI. *J Comput Assist Tomogr* 1992; 16:3-6
78. Hug J, Nagel E, Bornstedt A, Schnackenburg B, Oswald H, Fleck E: Coronary arterial stents: safety and artifacts during MR imaging. *Radiology* 2000;216:781-787
79. Inbar S, Larson J, Burt T, Mafee M, Ezri MD: Case report: nuclear magnetic resonance imaging in a patient with a pacemaker. *Am J Med Sci* 1993; 305:174-175
80. Jackson JG, Acker JD: Permanent eyeliner and MR imaging. *AJR Am J Roentgenol* 1987; 49:1080
81. Jain R, Petrillo-Albarano T, Parks WJ, Linzer JF Sr, Stockwell JA: Efficacy and safety of deep sedation by non-anesthesiologists for cardiac MRI in children. *Pediatr Radiol* 2013; 43:605-611
82. Jorgensen NH, Messick JM, Gray J, Nugent M, Berquist TH: ASA monitoring standards and magnetic resonance imaging. *Anesth Analg* 1994;79:1141-1147
83. Joshi G, Tobias JD: Remifentanyl to facilitate high-resolution computed tomography imaging of the chest or magnetic resonance imaging in infants. *South Med J* 2009; 102:1121-1124
84. Kaila R, Chen X, Kannikeswaran N: Postdischarge adverse events related to sedation for diagnostic imaging in children. *Pediatr Emerg Care* 2012; 28:796-801
85. Kanal E, Gillen J, Evans JA, Savitz DA, Shellock FG: Survey of reproductive health among female MR workers. *Radiology* 1993; 187:395-399

86. Kannikeswaran N, Sethuraman U, Sivaswamy L, Chen X, Mahajan PV: Children with and without developmental disabilities: sedation medication requirements and adverse events related to sedation. *Pediatr Emerg Care* 2012; 28:1036-1040
87. Karian VE, Burrows PE, Zurakowski D, Connor L, Mason KP: Sedation for pediatric radiological procedures: analysis of potential causes of sedation failure and paradoxical reactions. *Pediatr Radiol* 1999; 29:869-873
88. Kaste S, Laningham F, Stazzone M, Brown SD, Emery K, Newman B, Racadio J, Estroff J, Brill P, Mendelson KL, Slovis TL, Frush D: Safety in pediatric MR and cardiac CT: results of a membership survey of the Society for Pediatric Radiology-2006. *Pediatr Radiol* 2007; 37:409-412
89. Kean DM, Worthington BS, Firth JL, Hawkes RC: The effect of magnetic resonance imaging on different types of microsurgical clips. *J Neurol Neurosurg Psychiatry* 1985; 48:286-287
90. Kelly WM, Paglen PG, Pearson JA, San Diego AG, Solomon MR: Ferromagnetism of intraocular foreign body causes unilateral blindness after MR study. *AJNR Am J Neuroradiol* 1986; 7:243-245
91. Khurana A, Runge VM, Narayanan M, Greene JF Jr., Nickel AE: Nephrogenic systemic fibrosis: a review of 6 cases temporally related to gadodiamide injection. *Invest Radiol* 2007; 42:139-145
92. Klucznik R, Carrier D, Pyka R, Haid R: Placement of a ferromagnetic intracerebral aneurysm clip in a magnetic field with a fatal outcome. *Radiology* 1993; 187:855-856
93. Konings MK, Bartels LW, Smits HFM, Bakker CJG: Heating around intravascular guidewires by resonating RF waves. *J Magn Reson Imaging* 2000; 12:79-85
94. Kovac A, Swahson B, Elliott C, Wetzel L: Effect of distance and infusion rate on operation of Medfusion 2010 infusion pump during magnetic resonance imaging. *Anesth Analg* 1999; 88:S186
95. Kugel H, Bremer C, Püschel M, Fischbach R, Lenzen H, Tombach B, Van Aken H, Heindel W: Hazardous situation in the MR bore: induction in ECG leads causes fire. *Eur Radiol* 2003; 13: 690-694
96. Laakman RW, Kaufman B, Han JS, Nelson AD, Clampitt M, O'Block AM, Haaga JR, Alfidi RJ: MR imaging in patients with metallic implants. *Radiology* 1985; 157-711-714
97. Lauck G, von Smekal A, Wolke S, Seelos KC, Jung W, Manz M, Luderitz B: Effects of nuclear magnetic resonance imaging on cardiac pacemakers. *Pacing Clin Electrophysiol* 1995; 18:1549-1555
98. Li W, Wait SD, Ogg RJ, Scoggins MA, Zou P, Wheless J, Boop FA: Functional magnetic resonance imaging of the visual cortex performed in children under sedation to assist in presurgical planning. *J Neurosurg Pediatr* 2013; 11:543-546
99. Luechinger R, Duru F, Scheidegger MB, Boesiger P, Dandinas R: Force and torque effects of a 1.5 Tesla MRI scanner on cardiac pacemakers and ICDs. *Pacing Clin Electrophysiol* 2001; 24:199-205
100. Luechinger R, Zeijlemaker VA, Pederson EM, Mortensen P, Falk E, Duru F, Candinas R, Boesiger P: In vivo heating of pacemaker leads during magnetic resonance imaging. *Eur Heart J* 2005; 26:376-383
101. Lund G, Nelson JD, Wirtschafter JD, Williams PA: Tattooing of eyelids; magnetic resonance imaging artifacts. *Ophthalmol Surg* 1986; 17:550553

102. Machata AM, Kabon B, Willschke H, Prayer D, Marhofer P: Upper airway size and configuration during propofol-based sedation for magnetic resonance imaging: an analysis of 138 infants and children. *Paediatr Anaesth* 2010; 20:994-1000
103. Machata AM, Willschke H, Kabon B, Kettner SC, Marhofer P: Propofol-based sedation regimen for infants and children undergoing ambulatory magnetic resonance imaging. *Br J Anaesth* 2008; 101:239-243
104. Malviya S., Voepel-Lewis T., Eldevik O.P., Rockwell D.T., Wong J.H., Tait A.R: Sedation and general anaesthesia in children undergoing MRI and CT: adverse events and outcomes. *Br J Anaesth* 2000; 84:743-748
105. Manuli MA, Davies L: Rectal methohexital for sedation of children during imaging procedures. *AJR Am J Roentgenol* 1993; 160:577-580
106. Marckmann P, Skov L, Rossen K, Dupont A, Damholt MB, Heaf JG, Thomsen HS: Nephrogenic systemic fibrosis: suspected etiological role of gadodiamide used for contrast-enhanced magnetic resonance imaging. *J Am Soc Nephrol* 2006; 17:2359-2362
107. Martin ET, Coman JA, Shellock FG, Pulling CC, Fair R, Jenkins K: Magnetic resonance imaging and cardiac pacemaker safety at 1.5 T. *J Am Coll Cardiol* 2004; 43:1315-1324
108. Maruf AA, Hossain MD, Ahmed M, Samsad IA: Procedural sedation in children for magnetic resonance imaging - comparison between ketamine diazepam combination with midazolam fentanyl combination. *Mymensingh Med J* 2010; 19:60-65
109. Mason KP, Burrows PE, Dorsey MM, Zurakowski D, Krauss B: Accuracy of capnography with a 30 foot nasal cannula for monitoring respiratory rate and end-tidal CO₂ in children. *J Clin Monit Comput* 2000; 16:259-262
110. Mason KP, Fontaine PJ, Robinson F, Zgleszewski S: Pediatric sedation in a community hospital-based outpatient MRI center. *AJR Am J Roentgenol* 2012; 198:448-452
111. Mason KP, Lubisch NB, Robinson F, Roskos R: Intramuscular dexmedetomidine sedation for pediatric MRI and CT. *AJR Am J Roentgenol* 2011; 197:720-725
112. Mason KP, Sanborn P, Zurakowski D, Karian VE, Connor L, Fontaine PJ, Burrows PE: Superiority of pentobarbital versus chloral hydrate for sedation in infants during imaging. *Radiology* 2004; 230:537-542
113. Mason KP, Zurakowski D, Connor L, Karian VE, Fontaine PJ, Sanborn PA, Burrows PE: Infant sedation for MR imaging and CT: oral versus intravenous pentobarbital. *Radiology* 2004; 233:723-728
114. Mattioli C, Gemma M, Baldoli C, Sessa M, Albertin A, Beretta L: Sedation for children with metachromatic leukodystrophy undergoing MRI. *Paediatr Anaesth* 2007; 17:64-69
115. McArdle CB, Nicholas DA, Richardson CJ, Amparo EG: Monitoring of the neonate undergoing MR imaging: technical considerations. *Radiology* 1986; 159:223-226
116. Merola C, Albarracin C, Lebowitz P, Bienkowski RS, Barst SM: An audit of adverse events in children sedated with chloral hydrate or propofol during imaging studies. *Paediatr Anaesth* 1995; 5:375-378
117. Mirvis SE, Borg U, Belzberg H: MR imaging of ventilator-dependent patients: preliminary experience. *AJR Am J Roentgenol* 1987; 149:845-846
118. Moscatel MA, Shellock FG, Morisoli SM: Biopsy needles and devices: assessment of ferromagnetism and artifacts during exposure to a 1.5 T MR system. *J Magn Reson Imaging* 1995; 5:369-372
119. Murphy KJ, Brunberg JA, Cohan RH: Adverse reactions to gadolinium contrast media: a review of 36 cases. *AJR Am J Roentgenol* 1996; 167:847-849

120. Odegard KC, Dinardo JA, Tsai-Goddman B, Powell AJ, Geva T, Laussen PC: Anaesthesia considerations for cardiac MRI in infants and children. *Paediatr Anaesth* 2004; 14:471-476
121. Oğurlu M, Orhan ME, Bilgin F, Sizlan A, Yanarateş O, Yilmaz N: Efficacy of different concentrations of sevoflurane administered through a face mask for magnetic resonance imaging in children. *Paediatr Anaesth* 2010; 20:1098-1104
122. Okada S, Katagiri K, Kumazaki T, Yokoyama H: Safety of gadolinium contrast agent in hemodialysis patients. *Acta Radiol* 2001; 42:339-341
123. Pavlicek W, Geisinger M, Castle L, Borkowski GP, Meaney TF, Bream BL, Gallagher JH: The effects of nuclear magnetic resonance on patients with cardiac pacemakers. *Radiology* 1983; 147:149-153
124. Peden CJ, Collins AG, Butson PC, Whitwam JG, Young IR: Induction of microcurrents in critically ill patients in magnetic resonance systems. *Crit Care Med* 1993; 21:1923-1928
125. Pershad J, Wan J, Angheliescu DL: Comparison of propofol with pentobarbital/midazolam/fentanyl sedation for magnetic resonance imaging of the brain in children. *Pediatrics* 2007; 120:e629-e636
126. Philbin MK, Taber KH, Hayman LA: Preliminary report: changes in vital signs of term newborns during MR. *AJNR Am J Neuroradiol* 1996; 17:1033-1036
127. Pruefer D, Kalden P, Schreiber W, Dahm M, Buerke M, Thelen M, Oelert H: In vitro investigation of prosthetic heart valves in magnetic resonance imaging: evaluation of potential hazards. *J Heart Valve Dis* 2001; 10:410-414
128. Rangamani S, Varghese J, Li L, Harvey L, Hammel JM, Fletcher SE, Duncan KF, Danford DA, Kutty S: Safety of cardiac magnetic resonance and contrast angiography for neonates and small infants: a 10-year single-institution experience. *Pediatr Radiol* 2012; 42:1339-1346
129. Rezai AR, Finelli D, Nyenhuis JA, Hrdlicka G, Tkach J, Sharan A, Rugieri P, Stypulkowski PH, Shellock FG: Neurostimulation systems for deep brain stimulation: in vitro evaluation of MRI-related heating at 1.5 tesla. *J Magn Reson Imaging* 2002; 15:241-250
130. Roguin A, Donahue JK, Bomma CS, Bluemke DA, Halperin HR: Cardiac magnetic resonance imaging in a patient with implantable cardioverter-defibrillator. *Pacing Clin Electrophysiol* 2005; 28:336-338
131. Roguin A, Zviman MM, Meininger GR, Rodrigues ER, Dickfeld TM, Bluemke DA, Lardo A, Berger RD, Calkins H, Halperin HR: Modern pacemaker and implantable cardioverter/defibrillator systems can be magnetic resonance imaging safe: In vitro and in vivo assessment of safety and function at 1.5 T. *Circulation* 2004; 110:475-482
132. Romner B, Olsson M, Ljunggren B, Holtas S, Saveland H, Brandt L, Persson B: Magnetic resonance imaging and aneurysm clips. *J Neurosurg* 1989; 70:426-431
133. Rotello LC, Radin EJ, Jastremski MS, Craner D, Milewski A: MRI protocol for critically ill patients. *Am J Crit Care* 1994; 3:187-190
134. Roth JLO, Nugent M, Gray JE, Julsrud RR: Patient monitoring during magnetic resonance imaging. *Anesthesiology* 1985; 62:80-83
135. Rozner MA, Burton AW, Kumar AJ: Pacemaker complication during MRI: *J Am Coll Cardiol* 2005; 45:161-162

136. Rupperecht T, Kuth R, Bowing B, Gerling S, Wagner M, Rascher W: Sedation and monitoring of paediatric patients undergoing open low-field MRI. *Acta Paediatr* 2000; 89:1077-1081
137. Salvo I, Colombo S, Capocasa T, Torri G: Pulse oximetry in MRI units. *J Clin Anesth* 1990; 2:65-66
138. Sanborn PA, Michna E, Zurakowski D, Burrows PE, Fontaine PJ, Connor L, Mason KP: Adverse cardiovascular and respiratory events during sedation of pediatric patients for imaging examinations. *Radiology* 2005; 237:288-294
139. Schmiedel A, Hackenbroch M, Yang A, Nahle CP, Skowasch D, Meyer C, Schimpf R, Schild H, Sommer T: Magnetic resonance imaging of the brain in patients with cardiac pacemakers. In-vitro and in-vivo evaluation at 1.5 Tesla. *Rofo* 2005; 177:731-744
140. Schueler BA, Parrish TB, Lin JC, Hammer BE, Pangrle BJ, Ritenour ER, Kucharczyk J, Truweit CL: MRI compatibility and visibility assessment of implantable medical devices. *J Magn Reson Imag* 1999;9:596-603
141. Shellock F, Crues J: High field strength MR imaging and mettalic biomedical implants: an ex vivo evaluation of deflection forces. *AJR Am J Roentgenol* 1988; 151:389-392
142. Shellock FG, Cosendai G, Park SM, Nyenhuis JA: Implantable microstimulator: magnetic resonance safety at 1.5 T: *Invest Radiol* 2004; 39:591-599
143. Shellock FG, Fieno DS, Thomson LJ, Talavage TM, Berman DS: Cardiac pacemaker: In vitro assessment at 1.5 T. *American Heart J* 2006; 2:436-443
144. Shellock FG, Fischer L, Fieno DS: Cardiac pacemakers and implantable cardioverter defibrillators: in vitro magnetic resonance imaging evaluation at 1.5-tesla. *J Cardiovasc Magn Reson* 2007; 9:21-31
145. Shellock FG, Hatfield M, Simon BJ, Block S, Wamboldt R, Starewica PM, Punched WFB: Implantable spinal fusion stimulator: assessment of MRI safety. *J Magn Reson Imaging* 2000; 12:214-223
146. Shellock FG, Morisoli SM: Ex vivo evaluation of ferromagnetism, heating, and artifacts produced by heart valve prostheses exposed to a 1.5T MR system. *J Magn Reson Imaging* 1994; 4:756-758
147. Shellock FG, O'Neil M, Ivans V, Kelly D, O'Connor M, Toay L, Crues JV: Cardiac pacemakers and implantable cardioverter defibrillators are unaffected by operation of an extremity MR imaging system. *AJR Am J Roentgenol* 1999; 172:165-170
148. Shellock FG, Shellock VJ: Metallic stents: evaluation of MR imaging safety. *AJR Am J Roentgenol* 1999; 173:543-547
149. Shellock FG, Shellock VJ: Vascular access ports and catheters: ex vivo testing of ferromagnetism, heating and artifacts associated with MR imaging. *Magn Reson Imaging* 1996; 14:443-447
150. Shellock FG, Slimp GL: Severe burn of the finger caused by using a pulse oximeter during MR imaging. *AJR Am J Roentgenol* 1989; 153:1105
151. Shellock FG: Biomedical implants and devices: assessment of magnetic field interactions with a 3.0-Tesla MR system. *J Magn Reson Imaging* 2002; 16:721-732
152. Shellock FG: Prosthetic heart valves and annuloplasty rings: assessment of magnetic field interactions, heating , and artifacts at 1.5 Tesla. *J Cardiovasc Magn Reson* 2001; 3:317-324

153. Shepherd JK, Hall-Craggs MA, Finn JP, Bingham RM: Sedation in children scanned with high-field magnetic resonance; the experience at the Hospital for Sick Children, Great Ormond Street. *Br J Radiol* 1990; 63: 794-797
154. Shorrab AA, Demain AD, Atallah MM: Multidrug intravenous anesthesia for children undergoing MRI: a comparison with general anesthesia. *Paediatr Anaesth* 2007; 17:1187-1193
155. Slovis TL, Parks C, Reneau D, Becker CJ, Hersch J, Carver CD, Ross RD, Tech K, Towbin RB: Pediatric sedation: short-term effects. *Pediatr Radiol* 1993; 23:345-348
156. Smith DS, Askey P, Young ML, Kressel HY: Anesthetic management of acutely ill patients during magnetic resonance imaging. *Anesthesiology* 1986; 65:710-711
157. Sommer T, Vahiahaus C, Lauck G, von Smekal A, Reinke M, Hofer U, Block W, Traber F, Schneider C, Gieseke J, Jung W, Schild H: MR Imaging and cardiac pacemakers: in vitro evaluation and in vivo studies in 51 patients at 0.5 T. *Radiology* 2000; 215:869-879
158. Soulon R, Budinger T, Higgins C: Magnetic resonance imaging of prosthetic heart valves. *Radiology* 1985; 154:705-707
159. Stockton E, Hughes M, Broadhead M, Taylor A, McEwan A: A prospective audit of safety issues associated with general anesthesia for pediatric cardiac magnetic resonance imaging. *Paediatr Anaesth* 2012; 22:1087-1093
160. Sury MRJ, Harker H, Thyomas ML: Sevoflurane sedation in infants undergoing MRI: a preliminary report. *Paediatr Anaesth* 2005; 15:16-22
161. Taber KH, Hayman LA, Northrup SR, Maturi L: Vital sign changes during infant magnetic resonance examinations. *J Magn Reson Imaging* 1998; 8:1252-1256
162. Teissl C, Kremser C, Hochmair ES, Hochmair-Desoyer IJ: Magnetic resonance imaging and cochlear implants: compatibility and safety aspects. *J Magn Reson Imaging* 1999; 9:26-38
163. Teitelbaum GP, Lin MC, Watanabe AT, Norfray JF, Young TI, Bradley WG, Jr.: Ferromagnetism and MR imaging: safety of carotid vascular clamps. *AJNR Am J Neuroradiol* 1990; 11:267-272
164. Thakral C, Alhariri J, Abraham JL: Long-term retention of gadolinium in tissues from nephrogenic systemic fibrosis patient after multiple gadolinium-enhanced MRI scans: case report and implications. *Contrast Media Mol Imaging* 2007; 2:199-205
165. Tith S, Lalwani K, Fu R: Complications of three deep sedation methods for magnetic resonance imaging. *J Anaesthesiol Clin Pharmacol* 2012; 28:178-184
166. Tobin JR, Spurrier EA, Wetzel RC: Anaesthesia for critically ill children during magnetic resonance imaging. *Br J Anaesth* 1992; 69:482-486
167. Tronnier VM, Stauber A, Hahnel S, Sarem-Asiani A: Magnetic resonance imaging with implanted neurostimulation systems: an in vitro and in vivo study. *Neurosurgery* 1999; 44:118-125
168. Utti RJ, Tsuboi Y, Pooley RA, Putzke JD, Turk, MF, Wszolek Z, Witte RJ, Wharen RE Jr.: Magnetic resonance imaging and deep brain stimulation. *Neurosurgery* 2002; 51:1423-1431
169. Vade A, Sukhani R, Dolenga M, Habisohn-Schuck C: Chloral hydrate sedation of children undergoing CT and MR imaging: safety as judged by American Academy of Pediatrics guidelines. *AJR Am J Roentgenol* 1995; 165:905-909

170. Valhaus C, Sommer T, Lewalter T, Schimpf R, Schumacher B, Jung W, Luderitz B: Interference with cardiac pacemakers by magnetic resonance imaging: are there irreversible changes at 0.5 Tesla? *Pacing Clin Electrophysiol* 2001; 24:489-495
171. Vangerven M, Van Hemelrijck J, Wouters P, Vandermeersch E, Van Aken H: Light anaesthesia with propofol for paediatric MRI. *Anaesthesia* 1992; 47:706-707
172. Volle E, Park W, Kaufman HJ: MRI examination and monitoring of pediatric patients under sedation. *Pediatr Radiol* 1996; 26:280-281
173. Von Roemeling R, Lanning RM, Eames FA: MR imaging of patients with implanted drug infusion pumps. *J Magn Reson Imaging* 1991; 1:77-81
174. Wagle WA, Smith M: Tattoo-induced skin burn during MR imaging. *AJR Am J Roentgenol* 2000; 174:1795
175. Weishaupt D, Quick HH, Nanz D, Schmidt M, Cassina PC, Debatin JF: Ligating clips for three-dimensional MR angiography at 1.5 T: in vitro evaluation. *Radiology* 2000; 214:902-907
176. Whitby EH, Paley MN, Smith MF, Sprigg A, Woodhouse N, Griffiths PD: Low field strength magnetic resonance imaging of the neonatal brain. *Arch Dis Child Fetal Ed* 2003; 88:F203-F208
177. Wichmann W, Von Ammon K, Fink U, Weik T, Yasargil GM: Aneurysm clips made of titanium: magnetic characteristics and artifacts in MR. *AJNR Am J Neuroradiol* 1997; 18:939-944
178. Williams EJ, Jones NS, Carpenter TA, Bunch CS, Menon DK: Testing of adult and paediatric ventilators for use in a magnetic resonance imaging unit. *Anaesthesia* 1999; 54:969-974
179. Williams MD, Antonelli PJ, Williams LS, Moorhead JE: Middle ear prosthesis displacement in high-strength magnetic fields. *Otol Neurotol* 2001; 22:158-161
180. Wollmann C, Grude M, Tombach B, Kugel H, Heindel W, Breithardt G, Bocker D, Valhaus C: Safe performance of magnetic resonance imaging on a patient with an ICD. *Pacing Clin Electrophysiol* 2005; 28:339-342
181. Woodthorpe C, Trigg A, Alison G, Sury M: Nurse led sedation for paediatric MRI: progress and issues. *Paediatr Nurs* 2007; 19:14-18
182. Wynnchenko TM, Szokol JW, Murphy GS: Infusion pump use in the MRI. *Anesth Analg* 2000; 91:249-250
183. Zhang J, Wilson CL, Levesque MF, Behnke EJ, Lufkin RB: Temperature changes in nickle-chromium intracranial depth electrodes during MR scanning. *AJNR Am J Neuroradiol* 1993; 14:497-500