

Cardiac Rhythm Disturbances

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REFERENCES

- Deal N: Evaluation and management of bradydysrhythmias in the emergency department. *Emerg Med Pract* 15: 1, 2013. [PMID: 24044868]
- Brady WJ, Swart G, DeBehnke DJ, Ma OJ, Aufderheide TP: The efficacy of atropine in the treatment of hemodynamically unstable bradycardia and atrioventricular block: prehospital and emergency department considerations. *Resuscitation* 41: 47, 1999. [PMID: 10459592]
- Swart G, Brady WJ, DeBehnke DJ, Ma OJ, Aufderheide TP: Acute myocardial infarction complicated by hemodynamically unstable bradyarrhythmia: prehospital and emergency department treatment with atropine. *Am J Emerg Med* 17: 647, 1999. [PMID: 10597081]
- Da Costa D, Brady WJ, Edhouse J: Bradycardias and atrioventricular conduction block. *BMJ* 324: 535, 2002. [PMID: 11872557]
- Goldberger ZD, Rho RW, Page RL: Approach to the diagnosis and initial management of the stable adult patient with a wide complex tachycardia. *Am J Cardiol* 101: 1456, 2008. [PMID: 18471458]
- Borloz MP, Mark DG, Pines JM, Brady WJ: Electrocardiographic differential diagnosis of narrow QRS complex tachycardia: an ED-oriented algorithmic approach. *Am J Emerg Med* 28: 378, 2010. [PMID: 20223399]
- Hollowell H, Mattu A, Perron AD, Holstege C, Brady WJ: Wide-complex tachycardia: beyond the traditional differential diagnosis of ventricular tachycardia vs supraventricular tachycardia with aberrant conduction. *Am J Emerg Med* 23: 876, 2005. [PMID: 16291445]
- Hudson KB, Brady WJ, Chan TC, Pollack M, Harrigan RA: Electrocardiographic manifestations: ventricular tachycardia. *J Emerg Med* 25: 303, 2003. [PMID: 14585460]
- Richmond HC, Taylor L, Monroe MH, Littmann L: A new algorithm for the initial evaluation and management of supraventricular tachycardia. *Am J Emerg Med* 24: 402, 2006. [PMID: 16787795]
- Wen ZC, Chen SA, Tai CT, et al: Electrophysiological mechanisms and determinants of vagal maneuvers for termination of paroxysmal supraventricular tachycardia. *Circulation* 98: 2716, 1998. [PMID: 9851958]
- Smith G, Broek A, Taylor DM, Morgans A, Cameron P: Identification of the optimum vagal manoeuvre technique for maximising vagal tone. *Emerg Med J* 32: 51, 2015. [PMID: 24902881]
- Vinson DR, Hoehn T, Graber DJ, Williams TM: Managing emergency department patients with recent-onset atrial fibrillation. *J Emerg Med* 42: 139, 2012. [PMID: 20634022]
- Xanthos T, Ekmektzoglou KA, Vlachos IS, et al: A prognostic index for the successful use of adenosine in patients with paroxysmal supraventricular tachycardia in emergency settings: a retrospective study. *Am J Emerg Med* 26: 304, 2008. [PMID: 18358941]
- deSouza IS, Martindale JL, Sinert R: Antidysrhythmic drug therapy for the termination of stable, monomorphic ventricular tachycardia: a systematic review. *Emerg Med J* 32: 161, 2015. [PMID: 24042252]
- Ulus T, Kudaiberdieva G, Gorenek B: The onset mechanisms of ventricular tachycardia. *Int J Cardiol* 167: 619, 2013. [PMID: 23040077]
- Cheriyath P, He F, Peters I, et al: Relation of atrial and/or ventricular premature complexes on a two-minute rhythm strip to the risk of sudden cardiac death (the Atherosclerosis Risk in Communities [ARIC] study). *Am J Cardiol* 107: 151, 2011. [PMID: 21211594]
- Ataklte F, Erqou S, Laukkanen J, Kaptoge S: Meta-analysis of ventricular premature complexes and their relation to cardiac mortality in general populations. *Am J Cardiol* 112: 1263, 2013. [PMID: 23927786]
- Giles K, Green M: Workup and management of patients with frequent premature ventricular contractions. *Can J Cardiol* 29: 1512, 2013. [PMID: 24182757]
- Cantillon DJ: Evaluation and management of premature ventricular complexes. *Cleve Clin J Med* 80: 377, 2013. [PMID: 23733905]
- January CT, Wann LS, Alpert JS, et al: 2014 AHA/ACC/HRS guideline for the management of patients with atrial fibrillation: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the Heart Rhythm Society. *J Am Coll Cardiol* 64: e1, 2014. [PMID: 24685669]
- Bradley A, Sheridan P: Atrial fibrillation. *BMJ* 346: f3719, 2013. [PMID: 23775800]
- Nuotio I, Hartikainen JE, Grönberg T, Biancari F, Airaksinen KE: Time to cardioversion for acute atrial fibrillation and thromboembolic complications. *JAMA* 312: 647, 2014. [PMID: 25117135]
- Airaksinen KE, Grönberg T, Nuotio I, et al: Thromboembolic complications after cardioversion of acute atrial fibrillation: the FinCV (Finnish CardioVersion) study. *J Am Coll Cardiol* 62: 1187, 2013. [PMID: 23850908]
- Bontempo LJ, Goralnick E: Atrial fibrillation. *Emerg Med Clin North Am* 29: 747, 2011. [PMID: 22040705]
- Stiell IG, Macle L; CCS Atrial Fibrillation Guidelines Committee: Canadian Cardiovascular Society atrial fibrillation guidelines 2010: management of recent-onset atrial fibrillation and flutter in the emergency department. *Can J Cardiol* 27: 38, 2011. [PMID: 21329861]
- Coll-Vinent B, Fuenzalida C, García A, Martín A, Miró O: Management of acute atrial fibrillation in the emergency department: a systematic review of recent studies. *Eur J Emerg Med* 20: 151, 2013. [MID: 23010989]
- Buccelletti F, Carroccia A, Marsiliani D, Gilardi E, Silveri NG, Franceschi F: Utility of routine thyroid-stimulating hormone determination in new-onset atrial fibrillation in the ED. *Am J Emerg Med* 29: 1158, 2011. [PMID: 20708873]
- Scheuermeyer FX, Grafstein E, Stenstrom R, et al: Thirty-day and 1-year outcomes of emergency department patients with atrial fibrillation and no acute underlying medical cause. *Ann Emerg Med* 60: 755, 2012. [PMID: 22738681]
- Doyle B, Reeves M: "Wait and see" approach to the emergency department cardioversion of acute atrial fibrillation. *Emerg Med Int* 2011: 545023, 2011. [PMID: 22145078]
- Scheuermeyer FX, Pourvali R, Rowe BH, et al: Emergency department patients with atrial fibrillation or flutter and an acute underlying medical illness may not benefit from attempts to control rate or rhythm. *Ann Emerg Med* November 6, 2014. [Epub ahead of print] [PMID: 25441768]
- Verma A, Cairns JA, Mitchell LB, et al: 2014 focused update of the Canadian Cardiovascular Society Guidelines for the management of atrial fibrillation. *Can J Cardiol* 30: 1114, 2014. [PMID: 25262857]
- Martindale JL, deSouza IS, Silverberg M, Freedman J, Sinert R: β -Blockers versus calcium channel blockers for acute rate control of atrial fibrillation with rapid ventricular response: a systematic review. *Eur J Emerg Med* 22:150, 2015. [PMID: 25564459]
- Blecher GE, Stiell IG, Rowe BH, et al: Use of rate control medication before cardioversion of recent-onset atrial fibrillation or flutter in the emergency department is associated with reduced success rates. *CJEM* 14: 169, 2012. [PMID: 22575297]
- Cohn BG, Keim SM, Yealy DM: Is emergency department cardioversion of recent-onset atrial fibrillation safe and effective? *J Emerg Med* 45: 117, 2013. [PMID: 23643237]
- Stiell IG, Clement CM, Brison RJ, et al: Variation in management of recent-onset atrial fibrillation and flutter among academic hospital emergency departments. *Ann Emerg Med* 57: 13, 2011. [PMID: 20864213]
- Buccelletti F, Di Somma S, Galante A, et al: Disparities in management of new-onset atrial fibrillation in the emergency department despite adherence to the current guidelines: data from a large metropolitan area. *Intern Emerg Med* 6: 149, 2011. [PMID: 21318609]
- Hamilton A, Clark D, Gray A, Cragg A, Grubb N; on behalf of the Emergency Medicine Research Group, Edinburgh (EMERGE): The epidemiology and management of recent-onset atrial fibrillation and flutter presenting to the emergency department. *Eur J Emerg Med* 22:155, 2015. [PMID: 25203594]
- Olshansky B, Rosenfeld LE, Warner AL, et al: The atrial fibrillation follow-up investigation of rhythm management (AFFIRM) study. *J Am Coll Cardiol* 43: 1209, 2004. [PMID: 15063430]
- Hagens VE, Van Gelder IC, Crijns HJ, et al: The RACE study in perspective: rate control versus electrical cardioversion of persistent atrial fibrillation. The RACE study. *Card Electrophysiol Rev* 7: 118, 2003. [PMID: 14618033]
- Stiell IG, Clement CM, Symington C, Perry JJ, Vaillancourt C, Wells GA: Emergency department use of intravenous procainamide for patients with acute atrial fibrillation or flutter. *Acad Emerg Med* 14: 1158, 2007. [PMID: 18045891]
- Camm AJ, Lip GY, De Caterina R, et al: 2012 focused update of the ESC Guidelines for the management of atrial fibrillation: an update of the 2010 ESC Guidelines for the management of atrial fibrillation—developed with the special contribution of the European Heart Rhythm Association. *Europace* 14: 1385, 2012. [PMID: 22923145]
- Ghali WA, Wasil BL, Brant R, Exner DV, Cornuz J: Atrial flutter and the risk of thromboembolism: a systematic review and meta-analysis. *Am J Med* 118: 101, 2005. [PMID: 15694889]
- Luber S, Brady WJ, Joyce T, Perron AD: Paroxysmal supraventricular tachycardia: outcome after ED care. *Am J Emerg Med* 19: 40, 2001. [PMID: 11146016]
- Steinman RT, Herrera C, Schuger CD, Lehmann MH: Wide QRS tachycardia in the conscious adult. Ventricular tachycardia is the most frequent cause. *JAMA* 261: 1013, 1989. [PMID: 2915409]
- Katritsis D, Zareba W, Camm AJ: Nonsustained ventricular tachycardia. *J Am Coll Cardiol* 60: 1993, 2012. [PMID: 23083773]
- Ayad RF, Assar MD, Simpson L, Garner JB, Schussler JM: Causes and management of drug-induced long QT syndrome. *Proc (Bayl Univ Med Cent)* 23: 250, 2010. [PMID: 20671821]
- Brady WJ, DeBehnke DJ, Laundrie D: Prevalence, therapeutic response, and outcome of ventricular tachycardia in the out-of-hospital setting: a comparison of monomorphic ventricular tachycardia, polymorphic ventricular tachycardia, and torsades de pointes. *Acad Emerg Med* 6: 609, 1999. [PMID: 10386678]
- Banai S, Tzivoni D: Drug therapy for torsade de pointes. *J Cardiovasc Electrophysiol* 4: 206, 1993. [PMID: 8269292]
- Morrison Y, Thompson DF: Isoproterenol treatment of torsades de pointes. *Ann Pharmacother* 27: 189, 1993. [PMID: 8439698]
- Mukhopadhyay S, Chakraborty P, Yusuf J, Goyal A, Tyagi S: Phenytoin in treatment of amiodarone-induced torsades de pointes. *Indian J Pharmacol* 44: 264, 2012. [PMID: 22529489]
- Omar HR, Sprenger C, Karlnoski R, Mangar D, Camporesi EM: The use of isoproterenol and phenytoin to reverse torsade de pointes. *Am J Emerg Med* 32: 683.e5, 2014. [PMID: 24462399]
- Brugada P, Brugada J, Mont L, Smeets J, Andries EW: A new approach to the differential diagnosis of a regular tachycardia with a wide QRS complex. *Circulation* 83: 1649, 1991. [PMID: 2022022]
- Griffith MJ, Garratt CJ, Mounsey P, Camm AJ: Ventricular tachycardia as default diagnosis in broad complex tachycardia. *Lancet* 343: 386, 1994. [PMID: 7905552]

54. Lau EW, Pathamanathan RK, Ng GA, Cooper J, Skehan JD, Griffith MJ: The Bayesian approach improves the electrocardiographic diagnosis of broad complex tachycardia. *Pacing Clin Electrophysiol* 23: 1519, 2000. [PMID: 11060873]
55. Verecke A, Duray G, Szénási G, Altemose GT, Miller JM: New algorithm using only lead aVR for differential diagnosis of wide QRS complex tachycardia. *Heart Rhythm* 5: 89, 2008. [PMID: 18180024]
56. Pava LF, Perafán P, Badiel M, et al: R-wave peak time at DII: a new criterion for differentiating between wide complex QRS tachycardias. *Heart Rhythm* 7: 922, 2010. [PMID: 20215043]
57. Jastrzebski M, Kukla P, Czarnecka D, Kawecka-Jaszcz K: Comparison of five electrocardiographic methods for differentiation of wide QRS-complex tachycardias. *Europace* 14: 1165, 2012. [PMID: 22333239]
58. Baxi RP, Hart KW, Verecke A, et al: Verecke criteria used as a diagnostic tool by emergency medicine residents to distinguish between ventricular tachycardia and supra-ventricular tachycardia with aberrancy. *J Cardiol* 59: 307, 2012. [PMID: 22341435]
59. Szelényi Z, Duray G, Katona G, et al: Comparison of the "real-life" diagnostic value of two recently published electrocardiogram methods for the differential diagnosis of wide QRS complex tachycardias. *Acad Emerg Med* 20: 1121, 2013. [PMID: 24238314]
60. Verecke A: Current algorithms for the diagnosis of wide QRS complex tachycardias. *Curr Cardiol Rev* 10: 262, 2014. [PMID: 24827795]
61. Kaiser E, Darrieux FC, Barbosa SA, et al: Differential diagnosis of wide QRS tachycardias: comparison of two electrocardiographic algorithms. *Europace* January 18, 2015. [Epub ahead of print] [PMID: 25600765]
62. Marill KA, Wolfram S, Desouza IS, et al: Adenosine for wide-complex tachycardia: efficacy and safety. *Crit Care Med* 37: 2512, 2009. [PMID: 19623049]
63. Mark DG, Brady WJ, Pines JM: Preexcitation syndromes: diagnostic consideration in the ED. *Am J Emerg Med* 27: 878, 2009. [PMID: 19683122]
64. Liu A, Pusalkar P: Asymptomatic Wolff-Parkinson-White syndrome: incidental ECG diagnosis and a review of literature regarding current treatment. *BMJ Case Rep* 29: 2011, 2011. [PMID: 22693197]
65. Pappone C, Vicedomini G, Manguso F, et al: Wolff-Parkinson-White syndrome in the era of catheter ablation: insights from a registry study of 2169 patients. *Circulation* 130: 811, 2014. [PMID: 25052405]
66. Koźluk E, Timler D, Zyśko D, et al: Members of the emergency medical team may have difficulty diagnosing rapid atrial fibrillation in Wolff-Parkinson-White syndrome. *Cardiol J* November 27, 2014. [Epub ahead of print] [PMID: 25428731]
67. Simonian SM, Lotfipour S, Wall C, Langdorf MI: Challenging the superiority of amiodarone for rate control in Wolff-Parkinson-White and atrial fibrillation. *Intern Emerg Med* 5: 421, 2010. [PMID: 20437113]
68. Siegelman JN, Marill KA, Adler JN: Tachydysrhythmia treatment and adverse events in patients with Wolff-Parkinson-White syndrome. *J Emerg Med* 47: 357, 2014. [PMID: 24880554]
69. Pediatric and Congenital Electrophysiology Society (PACES), Heart Rhythm Society (HRS), American College of Cardiology Foundation (ACCF), et al: PACES/HRS expert consensus statement on the management of the asymptomatic young patient with a Wolff-Parkinson-White (WPW, ventricular preexcitation) electrocardiographic pattern: developed in partnership between the Pediatric and Congenital Electrophysiology Society (PACES) and the Heart Rhythm Society (HRS). Endorsed by the governing bodies of PACES, HRS, the American College of Cardiology Foundation (ACCF), the American Heart Association (AHA), the American Academy of Pediatrics (AAP), and the Canadian Heart Rhythm Society (CHRS). *Heart Rhythm* 9: 1006, 2012. [PMID: 22579340]
70. Mattu A, Rogers RL, Kim H, Perron AD, Brady WJ: The Brugada syndrome. *Am J Emerg Med* 21: 146, 2003. [PMID: 12671818]
71. Brugada P, Brugada J, Roy D: Brugada syndrome 1992-2012: 20 years of scientific excitement, and more. *Eur Heart J* 34: 3610, 2013. [PMID: 24186898]
72. Jellins J, Mulanovic M, Taitz DJ, Wan SH, Yam PW: Brugada syndrome. *Hong Kong Med J* 19: 159, 2013. [PMID: 23535677]
73. Kim JB: Channelopathies. *Korean J Pediatr* 57: 1, 2014. [PMID: 24578711]
74. de Luna AB, Garcia-Niebla J, Baranchuk A: New electrocardiographic features in Brugada syndrome. *Curr Cardiol Rev* 10: 175, 2014. [PMID: 24827804]
75. Arbelo E, Brugada J: Risk stratification and treatment of Brugada syndrome. *Curr Cardiol Rev* 16: 508, 2014. [PMID: 24893941]
76. Ward NJ, Fox CJ, Kralik KS, Haydar S, Saucier JR: 4 EKG abnormalities: what are the lifesaving diagnoses? *J Fam Pract* 63: 368, 2014. [PMID: 25198210]
77. Moskovitz JB, Hayes BD, Martinez JP, Mattu A, Brady WJ: Electrocardiographic implications of the prolonged QT interval. *Am J Emerg Med* 31: 866, 2013. [PMID: 23602761]
78. Zhang Y, Post WS, Blasco-Colmenares E, Dalal D, Tomaselli GF, Guallar E: Electrocardiographic QT interval and mortality: a meta-analysis. *Epidemiology* 22: 660, 2011. [PMID: 21709561]
79. Bhuiyan ZA, Al-Shahrani S, Al-Aama J, Wilde AA, Momenah TS: Congenital long QT syndrome: an update and present perspective in Saudi Arabia. *Front Pediatr* 1: 39, 2013. [PMID: 24400285]
80. Kallergis EM, Goudis CA, Simantirakis EN, Kochiadakis GE, Vardas PE: Mechanisms, risk factors, and management of acquired long QT syndrome: a comprehensive review. *ScientificWorldJournal* 2012: 212178, 2012. [PMID: 22593664]
81. Marzuillo P, Benettoni A, Germani C, Ferrara G, D'Agata B, Barbi E: Acquired long QT syndrome: a focus for the general pediatrician. *Pediatr Emerg Care* 30: 257, 2014. [PMID: 24694881]
82. Schwartz PJ, Crotti L: QTc behavior during exercise and genetic testing for the long-QT syndrome. *Circulation* 124: 2181, 2011. [PMID: 22083145]
83. Barra S, Agarwal S, Begley D, Providencia R: Post-acute management of the acquired long QT syndrome. *Postgrad Med J* 90: 348, 2014. [PMID: 24696523]
84. Schwartz PJ: Practical issues in the management of the long QT syndrome: focus on diagnosis and therapy. *Swiss Med Wkly* 143: w13843, 2013. [PMID: 24089242]
85. Schwartz PJ, Ackerman MJ: The long QT syndrome: a transatlantic clinical approach to diagnosis and therapy. *Eur Heart J* 34: 3109, 2013. [PMID: 23509228]