

Esmolol

Esmolol (trade name Brevibloc) is a cardioselective beta1 receptor blocker with rapid onset, a very short duration of action, and no significant intrinsic sympathomimetic or membrane stabilizing activity at therapeutic dosages.

It is a class II antiarrhythmic.

Esmolol decreases the force and rate of heart contractions by blocking beta-adrenergic receptors of the sympathetic nervous system, which are found in the heart and other organs of the body. Esmolol prevents the action of two naturally occurring substances: epinephrine and norepinephrine.

Despite reducing pain after laparoscopic cholecystectomy, esmolol did not prevent [Postoperative nausea and vomiting](#), whether used alone or in combination with ramosetron ¹.

Pending classification

1: Ji JY, Kim NS, Seo YH, Jung HS, Chun HR, Park JS, Choi JS, Ahn JM, Kim WJ. Comparing the effects of continuous infusion of esmolol and ramosetron alone and in combination on nausea and vomiting after laparoscopic cholecystectomy: A prospective, randomized, double-blind study. *Medicine (Baltimore)*. 2022 Sep 2;101(35):e30105. doi: 10.1097/MD.00000000000030105. PMID: 36107614.

2: Wahal C, Grant SA, Gadsden J, Rambhia MT, Bullock WM. Femoral artery block (FAB) attenuates thigh tourniquet-induced hypertension: a prospective randomized, double-blind, placebo-controlled trial. *Reg Anesth Pain Med*. 2021 Mar;46(3):228-232. doi: 10.1136/rapm-2020-102113. Epub 2021 Jan 11. PMID: 33431616.

3: Wang H, Zhang Y, Xin F, Jiang H, Tao D, Jin Y, He Y, Wang Q, Po SS. Calcium- Induced Autonomic Denervation in Patients With Post-Operative Atrial Fibrillation. *J Am Coll Cardiol*. 2021 Jan 5;77(1):57-67. doi: 10.1016/j.jacc.2020.10.049. PMID: 33413942.

4: Zhang Q, Sun Y, Wang B, Wang S, Mu F, Zhang Y. Comparative study of the Ambu® AuraOnce™ laryngeal mask and endotracheal intubation in anesthesia airway management during neurosurgery. *J Int Med Res*. 2020 Feb;48(2):300060520902606. doi: 10.1177/0300060520902606. PMID: 32036718; PMCID: PMC7111043.

5: Gao J, Wei L, Xu G, Ren C, Zhang Z, Liu Y. Effects of dexmedetomidine vs sufentanil during percutaneous tracheostomy for traumatic brain injury patients: A prospective randomized controlled trial. *Medicine (Baltimore)*. 2019 Aug;98(35):e17012. doi: 10.1097/MD.00000000000017012. PMID: 31464960; PMCID: PMC6736089.

6: Deng H, Coumans JV, Anderson R, Houle TT, Peterfreund RA. Spinal anesthesia for lumbar spine surgery correlates with fewer total medications and less frequent use of vasoactive agents: A single center experience. *PLoS One*. 2019 Jun 13;14(6):e0217939. doi: 10.1371/journal.pone.0217939. PMID: 31194777; PMCID: PMC6563985.

- 7: Cafferkey A, McMahon C. Successful Treatment of Refractory Cardiac Arrest With β -Blockade and Extracorporeal Life Support in a Pediatric Patient With Catecholaminergic Polymorphic Ventricular Tachycardia: A Case Report. *A A Pract.* 2018 Aug 1;11(3):63-67. doi: 10.1213/XAA.0000000000000736. PMID: 29634558.
- 8: Altıparmak B, Uysal Aİ, Yaşar E, Demirbilek S. Abordagem alternativa para instabilidade autonômica no tétano muito grave: bloqueio do gânglio estrelado [Alternative approach to autonomic instability of very severe tetanus: stellate ganglion block]. *Braz J Anesthesiol.* 2018 Mar-Apr;68(2):209-211. doi: 10.1016/j.bjan.2016.09.012. Epub 2017 May 24. PMID: 28551062; PMCID: PMC9391723.
- 9: Wang W, Feng L, Bai F, Zhang Z, Zhao Y, Ren C. The Safety and Efficacy of Dexmedetomidine vs. Sufentanil in Monitored Anesthesia Care during Burr-Hole Surgery for Chronic Subdural Hematoma: A Retrospective Clinical Trial. *Front Pharmacol.* 2016 Nov 3;7:410. doi: 10.3389/fphar.2016.00410. PMID: 27857689; PMCID: PMC5093316.
- 10: Gruenbaum SE, Meng L, Bilotta F. Recent trends in the anesthetic management of craniotomy for supratentorial tumor resection. *Curr Opin Anaesthesiol.* 2016 Oct;29(5):552-7. doi: 10.1097/ACO.0000000000000365. PMID: 27285727.
- 11: Asouhidou I, Trikoupi A. Esmolol reduces anesthetic requirements thereby facilitating early extubation; a prospective controlled study in patients undergoing intracranial surgery. *BMC Anesthesiol.* 2015 Nov 28;15:172. doi: 10.1186/s12871-015-0154-1. PMID: 26615516; PMCID: PMC4663038.
- 12: Mert T, Oksuz H, Tugtag B, Kilinc M, Sahin E, Altun I. Anti-hypernociceptive and anti-oxidative effects of locally treated dobutamine in diabetic rats. *Pharmacol Rep.* 2015 Oct;67(5):1016-23. doi: 10.1016/j.pharep.2015.03.009. Epub 2015 Mar 31. PMID: 26398398.
- 13: Srivastava VK, Agrawal S, Gautam SK, Ahmed M, Sharma S, Kumar R. Comparative evaluation of esmolol and dexmedetomidine for attenuation of sympathomimetic response to laryngoscopy and intubation in neurosurgical patients. *J Anaesthesiol Clin Pharmacol.* 2015 Apr-Jun;31(2):186-90. doi: 10.4103/0970-9185.155146. PMID: 25948898; PMCID: PMC4411831.
- 14: Bebawy JF, Houston CC, Kosky JL, Badri AM, Hemmer LB, Moreland NC, Carabini LM, Koht A, Gupta DK. Nicardipine is superior to esmolol for the management of postcraniotomy emergence hypertension: a randomized open-label study. *Anesth Analg.* 2015 Jan;120(1):186-192. doi: 10.1213/ANE.0000000000000473. PMID: 25296247.
- 15: Hosseinzadeh H, Eidy M, Ghaffarlou M, Ghabili K, Golzari SE. Esmolol: a unique Beta-blocker in maintaining cardiovascular stability following neurosurgical procedures. *Adv Pharm Bull.* 2012;2(2):249-52. doi: 10.5681/apb.2012.038. Epub 2012 Aug 15. PMID: 24312801; PMCID: PMC3845998.
- 16: Habel N, Müller JG, Znojkwicz P, Thompson N, Calame J, Calame S, Noori A, Gallo A, Lustgarten DL, Sobel BE, Spector PS. The impact of pharmacologic sympathetic and parasympathetic blockade on atrial electrogram characteristics in patients with atrial fibrillation. *Pacing Clin Electrophysiol.* 2011 Nov;34(11):1460-7. doi: 10.1111/j.1540-8159.2011.03212.x. PMID: 21883315.
- 17: Kesimci E, Öztürk L, Bercin S, Kırış M, Eldem A, Kanbak O. Role of sphenopalatine ganglion block for postoperative analgesia after functional endoscopic sinus surgery. *Eur Arch Otorhinolaryngol.* 2012 Jan;269(1):165-9. doi: 10.1007/s00405-011-1702-z. Epub 2011 Jul 8. PMID: 21739090.
- 18: Xie X, Visweswaran R, Guzman PA, Smith RM, Osborn JW, Tolkacheva EG. The effect of cardiac

sympathetic denervation through bilateral stellate ganglionectomy on electrical properties of the heart. *Am J Physiol Heart Circ Physiol*. 2011 Jul;301(1):H192-9. doi: 10.1152/ajpheart.01149.2010. Epub 2011 Apr 15. PMID: 21498778.

19: Kenyon CA, Flick R, Moir C, Ackerman MJ, Pabelick CM. Anesthesia for videoscopic left cardiac sympathetic denervation in children with congenital long QT syndrome and catecholaminergic polymorphic ventricular tachycardia—a case series. *Paediatr Anaesth*. 2010 May;20(5):465-70. doi: 10.1111/j.1460-9592.2010.03293.x. Epub 2010 Mar 22. PMID: 20337957; PMCID: PMC3332532.

20: Yang JJ, Shen JC, Xu JG. Cardiac asystole after nasal infiltration of lidocaine with epinephrine in a transsphenoidal hypophysectomy patient with hypertrophic cardiomyopathy. *J Neurosurg Anesthesiol*. 2010 Jan;22(1):81-2. doi: 10.1097/ANA.0b013e3181b8ada9. PMID: 19779368.

21: Silver ES, Liberman L, Chung WK, Spotnitz HM, Chen JM, Ackerman MJ, Moir C, Hordof AJ, Pass RH. Long QT syndrome due to a novel mutation in SCN5A: treatment with ICD placement at 1 month and left cardiac sympathetic denervation at 3 months of age. *J Interv Card Electrophysiol*. 2009 Oct;26(1):41-5. doi: 10.1007/s10840-009-9428-1. Epub 2009 Aug 11. PMID: 19669871; PMCID: PMC3332535.

22: Lu Z, Scherlag BJ, Lin J, Yu L, Guo JH, Niu G, Jackman WM, Lazzara R, Jiang H, Po SS. Autonomic mechanism for initiation of rapid firing from atria and pulmonary veins: evidence by ablation of ganglionated plexi. *Cardiovasc Res*. 2009 Nov 1;84(2):245-52. doi: 10.1093/cvr/cvp194. Epub 2009 Jun 11. PMID: 19520703; PMCID: PMC2764506.

23: Bilotta F, Lam AM, Doronzio A, Cuzzzone V, Delfini R, Rosa G. Esmolol blunts postoperative hemodynamic changes after propofol-remifentanyl total intravenous fast-track neuroanesthesia for intracranial surgery. *J Clin Anesth*. 2008 Sep;20(6):426-30. doi: 10.1016/j.jclinane.2008.04.006. PMID: 18929282.

24: Xing Y, Wang BG, Mi WD, An JX, Guo QL, Huang XQ. [Application of remifentanyl in neurosurgical anesthesia: a multi-center study]. *Zhonghua Yi Xue Za Zhi*. 2008 Apr 29;88(17):1163-7. Chinese. PMID: 18844108.

25: Bhagat H, Dash HH, Bithal PK, Chouhan RS, Pandia MP. Planning for early emergence in neurosurgical patients: a randomized prospective trial of low-dose anesthetics. *Anesth Analg*. 2008 Oct;107(4):1348-55. doi: 10.1213/ane.0b013e31817f9476. PMID: 18806051.

26: Degoute CS. Controlled hypotension: a guide to drug choice. *Drugs*. 2007;67(7):1053-76. doi: 10.2165/00003495-200767070-00007. PMID: 17488147.

27: Sharma A, Ramaswamy S, Bhatia SC. Electroconvulsive therapy after repair of cerebral aneurysm. *J ECT*. 2005 Sep;21(3):180-1. doi: 10.1097/01.yct.0000174214.93301.c2. PMID: 16127310.

28: Joshi S, Wang M, Etu JJ, Pile-Spellman J. Reducing cerebral blood flow increases the duration of electroencephalographic silence by intracarotid thiopental. *Anesth Analg*. 2005 Sep;101(3):851-858. doi: 10.1213/01.ANE.0000160583.42078.B2. PMID: 16116003.

29: Grillo P, Bruder N, Auquier P, Pellissier D, Gouin F. Esmolol blunts the cerebral blood flow velocity increase during emergence from anesthesia in neurosurgical patients. *Anesth Analg*. 2003 Apr;96(4):1145-1149. doi: 10.1213/01.ANE.0000055647.54957.77. PMID: 12651674.

30: Behnke H, Geldner G, Cornelissen J, Kahl M, Möller F, Cremer J, Wulf H. Postoperative Schmerztherapie bei minimal-invasiver direkter koronararterieller Bypass-Chirurgie (MIDCAB). I.v.-

- Opioid-PCA versus Interkostalblockaden [Postoperative pain therapy in minimally invasive direct coronary arterial bypass surgery. I.v. opioid patient-controlled analgesia versus intercostal block]. *Anaesthesist*. 2002 Mar;51(3):175-9. German. doi: 10.1007/s00101-002-0280-2. PMID: 11993078.
- 31: Tijero T, Ingelmo I, García-Trapero J, Puig A. Usefulness of monitoring brain tissue oxygen pressure during awake craniotomy for tumor resection: a case report. *J Neurosurg Anesthesiol*. 2002 Apr;14(2):149-52. doi: 10.1097/00008506-200204000-00011. PMID: 11907397.
- 32: Hemphill JC 3rd, Knudson MM, Derugin N, Morabito D, Manley GT. Carbon dioxide reactivity and pressure autoregulation of brain tissue oxygen. *Neurosurgery*. 2001 Feb;48(2):377-83; discussion 383-4. doi: 10.1097/00006123-200102000-00028. PMID: 11220382.
- 33: Nademanee K, Taylor R, Bailey WE, Rieders DE, Kosar EM. Treating electrical storm : sympathetic blockade versus advanced cardiac life support-guided therapy. *Circulation*. 2000 Aug 15;102(7):742-7. doi: 10.1161/01.cir.102.7.742. PMID: 10942741.
- 34: Kuchta J, Koulousakis A, Decker A, Klug N. Pressor and depressor responses in thermocoagulation of the trigeminal ganglion. *Br J Neurosurg*. 1998 Oct;12(5):409-13. doi: 10.1080/02688699844592. PMID: 10070442.
- 35: Warren JH, Jaffe RS, Wraa CE, Stebbins CL. Effect of autonomic blockade on power spectrum of heart rate variability during exercise. *Am J Physiol*. 1997 Aug;273(2 Pt 2):R495-502. doi: 10.1152/ajpregu.1997.273.2.R495. PMID: 9277531.
- 36: Samaha T, Ravussin P, Claquin C, Ecoffey C. Prévention de l'augmentation de la pression artérielle et de la pression intracrânienne lors de l'intubation endotrachéale en neurochirurgie: esmolol versus lidocaïne [Prevention of increase of blood pressure and intracranial pressure during endotracheal intubation in neurosurgery: esmolol versus lidocaine]. *Ann Fr Anesth Reanim*. 1996;15(1):36-40. French. doi: 10.1016/0750-7658(96)89400-7. PMID: 8729308.
- 37: Ornstein E, Young WL, Ostapkovich N, Matteo RS, Diaz J. Are all effects of esmolol equally rapid in onset? *Anesth Analg*. 1995 Aug;81(2):297-300. doi: 10.1097/00000539-199508000-00015. PMID: 7618718.
- 38: Januel B, Laude D, Elghozi JL, Escourrou P. Effect of autonomic blockade on heart rate and blood pressure in sleep apnea syndrome. *Blood Press*. 1995 Jul;4(4):226-31. doi: 10.3109/08037059509077599. PMID: 7496561.
- 39: Larsen R, Kleinschmidt S. Die kontrollierte Hypotension [Controlled hypotension]. *Anaesthesist*. 1995 Apr;44(4):291-308. German. doi: 10.1007/s001010050157. PMID: 7785759.
- 40: Mesa A, Kaplan RF. Dysrhythmias controlled with stellate ganglion block in a child with diabetes and a variant of long QT syndrome. *Reg Anesth*. 1993 Jan- Feb;18(1):60-2. PMID: 8095401.
- 41: Muzzi DA, Losasso TJ, Dietz NM, Faust RJ, Cucchiara RF, Milde LN. The effect of desflurane and isoflurane on cerebrospinal fluid pressure in humans with supratentorial mass lesions. *Anesthesiology*. 1992 May;76(5):720-4. doi: 10.1097/00000542-199205000-00009. PMID: 1575339.
- 42: Ravussin P. Caractéristiques et utilisation clinique de l'esmolol [Characteristics and clinical use of esmolol]. *Minerva Anesthesiol*. 1992 Apr;58(4 Suppl 1):77-9. French. PMID: 1352393.
- 43: Ravussin P, Revelly JP, Chiolerio R. Utilisation clinique du propofol en neuroanesthésie [Clinical use of propofol in neuroanesthesia]. *Agressologie*. 1991;32(8-9 Spec No):407-11. French. PMID: 1844205.

44: Lam AM. The choice of controlled hypotension during repair of intracranial aneurysms: techniques and complications. *Agressologie*. 1990 Jun;31(6):357-9. PMID: 1980992.

45: Gibson BE, Black S, Maass L, Cucchiara RF. Esmolol for the control of hypertension after neurologic surgery. *Clin Pharmacol Ther*. 1988 Dec;44(6):650-3. doi: 10.1038/clpt.1988.207. PMID: 2904310.

46: Hanich RF, Levine JH, Spear JF, Moore EN. Autonomic modulation of ventricular arrhythmia in cesium chloride-induced long QT syndrome. *Circulation*. 1988 May;77(5):1149-61. doi: 10.1161/01.cir.77.5.1149. PMID: 3359592.

47: Ornstein E, Matteo RS, Weinstein JA, Schwartz AE. A controlled trial of esmolol for the induction of deliberate hypotension. *J Clin Anesth*. 1988;1(1):31-5. doi: 10.1016/0952-8180(88)90008-6. PMID: 2908483.

48: Gorczynski RJ, Murthy VS, Hwang TF. Beta-blocking and hemodynamic effects of ASL-8052. *J Cardiovasc Pharmacol*. 1984 Nov-Dec;6(6):1548-59. PMID: 6084788.

1)

Ji JY, Kim NS, Seo YH, Jung HS, Chun HR, Park JS, Choi JS, Ahn JM, Kim WJ. Comparing the effects of continuous infusion of [esmolol](#) and [ramosetron](#) alone and in combination on [nausea](#) and [vomiting](#) after laparoscopic [cholecystectomy](#): A prospective, randomized, double-blind study. *Medicine (Baltimore)*. 2022 Sep 2;101(35):e30105. doi: 10.1097/MD.00000000000030105. PMID: 36107614.

From:

<https://neurosurgerywiki.com/wiki/> - **Neurosurgery Wiki**

Permanent link:

<https://neurosurgerywiki.com/wiki/doku.php?id=esmolol>

Last update: **2024/06/07 02:51**

