

- Made from iodine and poppyseed oil, this is a highly viscous agent. It is usually used for chemoembolizations, especially for hepatomas, since these tumors absorb iodine. The half-life is five days, so it only temporarily embolizes vessels. Sclerosing agents - These will harden the endothelial lining of vessels. They require more time to react than the liquid embolic agents. Therefore, they cannot be used for large or high-flow vessels.

1: Al-Mufti F, Kaur G, Amuluru K, Cooper JB, Dakay K, El-Ghanem M, Pisapia J, Muh C, Tyagi R, Bowers C, Cole C, Rosner S, Santarelli J, Mayer S, Gandhi C. Middle Meningeal Artery Embolization Using Combined Particle Embolization and *n*-BCA with the Dextrose 5% in Water Push Technique for Chronic Subdural Hematomas: A Prospective Safety and Feasibility Study. *AJNR Am J Neuroradiol*. 2021 May;42(5):916-920. doi: 10.3174/ajnr.A7077. Epub 2021 Mar 4. PMID: 33664110; PMCID: PMC8115365.

2: Paquet J, Cordier F, Vandersteene J. Spinal Syrinx Due to Lipiodol-Induced Arachnoiditis. *World Neurosurg*. 2021 May;149:64-66. doi: 10.1016/j.wneu.2021.02.022. Epub 2021 Feb 16. PMID: 33601077.

3: Savic LJ, Chapiro J, Funai E, Bousabarah K, Schobert IT, Isufi E, Geschwind JH, Stark S, He P, Rudek MA, Perez Lozada JC, Ayyagari R, Pollak J, Schlachter T. Prospective study of Lipiodol distribution as an imaging marker for doxorubicin pharmacokinetics during conventional transarterial chemoembolization of liver malignancies. *Eur Radiol*. 2021 May;31(5):3002-3014. doi: 10.1007/s00330-020-07380-w. Epub 2020 Oct 15. PMID: 33063185.

4: Brunozzi D, Alaraj A. Embolization of a Complex Facial Arteriovenous Malformation, Balloon-Assisted Flow Arrest, and Controlled *n*-BCA Injection with Dextrose Push Technique: 2-Dimensional Operative Video. *Oper Neurosurg (Hagerstown)*. 2019 Dec 1;17(6):E248. doi: 10.1093/ons/opz029. PMID: 30851033; PMCID: PMC6892379.

5: Shakur SF, Brunozzi D, Alaraj A. Transarterial glue embolization and covered stenting of a large carotid body tumor in the same setting: neuroendovascular surgical video. *World Neurosurg*. 2019 Jan 4:S1878-8750(18)32958-9. doi: 10.1016/j.wneu.2018.12.135. Epub ahead of print. PMID: 30615996.

6: Patro SN, Iancu D, Al Mansoori T, Lesiuk H, Vassilyadi M. Endovascular glue embolization of a radiation-induced lenticulostriate artery pseudoaneurysm in a pediatric patient with optic pathway glioma: Case report and review of literature. *Interv Neuroradiol*. 2018 Oct;24(5):499-508. doi: 10.1177/1591019918773303. Epub 2018 May 31. PMID: 29848144; PMCID: PMC6116129.

7: Ye M, Zhang P. Transarterial Balloon-Assisted Glue Embolization of Pial Arteriovenous Fistulas. *World Neurosurg*. 2018 Jul;115:e761-e767. doi: 10.1016/j.wneu.2018.04.171. Epub 2018 May 3. PMID: 29729454.

8: Kawahara D, Ozawa S, Saito A, Kimura T, Suzuki T, Tsuneda M, Tanaka S, Nakashima T, Ohno Y, Murakami Y, Nagata Y. Effect of secondary electron generation on dose enhancement in Lipiodol with and without a flattening filter. *J Appl Clin Med Phys*. 2018 Mar;19(2):211-217. doi: 10.1002/acm2.12282. Epub 2018 Feb 15. PMID: 29450985; PMCID: PMC5849857.

9: Lylyk P, Chudyk J, Bleise C, Serna Candel C, Aguilar Pérez M, Henkes H. Endovascular occlusion of pial arteriovenous macrofistulae, using pCANvas1 and adenosine-induced asystole to control *n*BCA injection. *Interv Neuroradiol*. 2017 Dec;23(6):644-649. doi: 10.1177/1591019917720921. Epub 2017 Jul 20. PMID: 28728535; PMCID: PMC5814065.

- 10: Gemmete JJ, Srinivasa RN, Chick JFB. Treatment of Chylous Ascites in a Child after Wilms Tumor Resection with Intranodal Injection of N-Butyl Cyanoacrylate Glue. *J Vasc Interv Radiol*. 2017 Jul;28(7):1067-1069. doi: 10.1016/j.jvir.2017.02.024. PMID: 28645505.
- 11: Chan M, Chiang CL, Lee V, Cheung S, Leung R, Wong M, Lee F, Blanck O. Target localization of 3D versus 4D cone beam computed tomography in lipiodol-guided stereotactic radiotherapy of hepatocellular carcinomas. *PLoS One*. 2017 Apr 6;12(4):e0174929. doi: 10.1371/journal.pone.0174929. PMID: 28384187; PMCID: PMC5383048.
- 12: Kawahara D, Ozawa S, Saito A, Nishio T, Kimura T, Suzuki T, Hioki K, Nakashima T, Ohno Y, Murakami Y, Nagata Y. Dosimetric impact of Lipiodol in stereotactic body radiation therapy on liver after trans-arterial chemoembolization. *Med Phys*. 2017 Jan;44(1):342-348. doi: 10.1002/mp.12028. PMID: 28102954.
- 13: Ohnishi H, Miyachi S, Murao K, Hiramatsu R, Takahashi K, Ohnishi H, Kuroiwa T. Infiltrated Embolization of Meningioma with Dilute Cyanoacrylate Glue. *Neurol Med Chir (Tokyo)*. 2017 Jan 15;57(1):44-50. doi: 10.2176/nmc.tn.2016-0144. Epub 2016 Sep 16. PMID: 27646010; PMCID: PMC5243164.
- 14: Takeda A, Sanuki N, Tsurugai Y, Iwabuchi S, Matsunaga K, Ebinuma H, Imajo K, Aoki Y, Saito H, Kunieda E. Phase 2 study of stereotactic body radiotherapy and optional transarterial chemoembolization for solitary hepatocellular carcinoma not amenable to resection and radiofrequency ablation. *Cancer*. 2016 Jul 1;122(13):2041-9. doi: 10.1002/cncr.30008. Epub 2016 Apr 8. PMID: 27062278.
- 15: Kawahara D, Ozawa S, Kimura T, Nakashima T, Aita M, Tsuda S, Ochi Y, Okumura T, Masuda H, Ohno Y, Murakami Y, Nagata Y. Availability of applying diaphragm matching with the breath-holding technique in stereotactic body radiation therapy for liver tumors. *Phys Med*. 2016 Apr;32(4):557-61. doi: 10.1016/j.ejomp.2016.02.007. Epub 2016 Mar 21. PMID: 27012541.
- 16: Paik EK, Kim MS, Jang WI, Seo YS, Cho CK, Yoo HJ, Han CJ, Park SC, Kim SB, Kim YH. Benefits of stereotactic ablative radiotherapy combined with incomplete transcatheter arterial chemoembolization in hepatocellular carcinoma. *Radiat Oncol*. 2016 Feb 19;11:22. doi: 10.1186/s13014-016-0597-7. PMID: 26896371; PMCID: PMC4759954.
- 17: Chan MK, Lee V, Chiang CL, Lee FA, Law G, Sin NY, Siu KL, Wong FC, Tung SY, Luk H, Blanck O. Lipiodol versus diaphragm in 4D-CBCT-guided stereotactic radiotherapy of hepatocellular carcinomas. *Strahlenther Onkol*. 2016 Feb;192(2):92-101. doi: 10.1007/s00066-015-0929-9. Epub 2015 Dec 3. PMID: 26636141.
- 18: Karim AB, Lindsey S, Bovino B, Berenstein A. Oral Surgical Procedures Performed Safely in Patients With Head and Neck Arteriovenous Malformations: A Retrospective Case Series of 12 Patients. *J Oral Maxillofac Surg*. 2016 Feb;74(2):255.e1-8. doi: 10.1016/j.joms.2015.10.012. Epub 2015 Oct 23. PMID: 26549473.
- 19: Labby ZE, Chaudhary N, Gemmete JJ, Pandey AS, Roberts DA. Dosimetric measurements of an n-butyl cyanoacrylate embolization material for arteriovenous malformations. *Med Phys*. 2015 Apr;42(4):1739-44. doi: 10.1118/1.4915080. PMID: 25832063.
- 20: Nie Q, Wu H, Guo P, Ge J, Qiu Y. Cerebral lipiodol embolism following abdomen trauma in a patient with hepatocellular carcinoma treated with transcatheter arterial chemoembolization. *Acta Neurol Belg*. 2015 Sep;115(3):459-61. doi: 10.1007/s13760-014-0376-x. Epub 2014 Oct 16. PMID: 25319130.

- 21: Kawahara D, Ozawa S, Nakashima T, Aita M, Kawai S, Ochi Y, Okumura T, Masuda H, Ohno Y, Kimura T, Nagata Y. [Availability of using diaphragm matching in stereotactic body radiotherapy (SBRT) at the time in breath-holding SBRT for liver cancer]. *Nihon Hoshasen Gijutsu Gakkai Zasshi*. 2014 Jan;70(1):51-6. Japanese. doi: 10.6009/jjrt.2014_jsrt_70.1.51. PMID: 24464064.
- 22: Yao KC, Malek AM. Transpedicular N-butyl cyanoacrylate-mediated percutaneous embolization of symptomatic vertebral hemangiomas. *J Neurosurg Spine*. 2013 May;18(5):450-5. doi: 10.3171/2013.1.SPINE11173. Epub 2013 Mar 1. PMID: 23452246.
- 23: Kominami S, Watanabe A, Akimoto M, Kobayashi S, Teramoto A. Superficial temporal arteriovenous fistula as a complication of rhytidectomy. *J Craniofac Surg*. 2012 Mar;23(2):603-5. doi: 10.1097/SCS.0b013e31824cd803. PMID: 22446426.
- 24: Takigawa T, Matsumaru Y, Hayakawa M, Ikeda K, Matsumura A. Transarterial embolization with use of lipiodol and gelatin sponge for active nasal bleeding from hepatocellular carcinoma metastasis in the pituitary gland. *Neurol Med Chir (Tokyo)*. 2011;51(8):592-5. doi: 10.2176/nmc.51.592. PMID: 21869584.
- 25: Mamalui-Hunter M, Jiang T, Rich KM, Derdeyn CP, Drzymala RE. Effect of liquid embolic agents on Gamma Knife surgery dosimetry for arteriovenous malformations. Clinical article. *J Neurosurg*. 2011 Aug;115(2):364-70. doi: 10.3171/2011.3.JNS10717. Epub 2011 Apr 15. PMID: 21495824.
- 26: Park YS, Park SW, Suk JS, Nam TK. Development of an acute obstructive hydrocephalus model in rats using N-butyl cyanoacrylate. *Childs Nerv Syst*. 2011 Jun;27(6):903-10. doi: 10.1007/s00381-011-1398-9. Epub 2011 Feb 1. PMID: 21286731.
- 27: Stephan MJ, Nesbit GM, Behrens ML, Whitaker MA, Barnwell SL, Selden NR. Endovascular treatment of spinal arteriovenous fistula in a young child with hereditary hemorrhagic telangiectasia. Case report. *J Neurosurg*. 2005 Nov;103(5 Suppl):462-5. doi: 10.3171/ped.2005.103.5.0462. PMID: 16302622.
- 28: Tamatani S, Koike T, Ito Y, Tanaka R. Embolization of Arteriovenous Malformation with Diluted Mixture of NBCA. *Interv Neuroradiol*. 2000 Nov 30;6 Suppl 1(Suppl 1):187-90. doi: 10.1177/15910199000060S129. Epub 2001 May 15. PMID: 20667245; PMCID: PMC3685916.
- 29: Sadato A, Wakhloo AK, Hopkins LN. Effects of a mixture of a low concentration of n-butylcyanoacrylate and ethiodol on tissue reactions and the permanence of arterial occlusion after embolization. *Neurosurgery*. 2000 Nov;47(5):1197-203; discussion 1204-5. doi: 10.1097/00006123-200011000-00037. PMID: 11063114.
- 30: Paulsen RD, Steinberg GK, Norbash AM, Marcellus ML, Lopez JR, Marks MP. Embolization of rolandic cortex arteriovenous malformations. *Neurosurgery*. 1999 Mar;44(3):479-84; discussion 484-6. doi: 10.1097/00006123-199903000-00022. PMID: 10069584.
- 31: Wakhloo AK, Lieber BB, Rudin S, Fronckowiak MD, Mericle RA, Hopkins LN. A novel approach to flow quantification in brain arteriovenous malformations prior to embolization: use of insoluble contrast (Ethiodol droplet) angiography. *J Neurosurg*. 1998 Sep;89(3):395-404. doi: 10.3171/jns.1998.89.3.0395. PMID: 9724113.
- 32: Onofrio BM. Recent results with percutaneous cordotomy. *Mayo Clin Proc*. 1970 Oct;45(10):689-94. PMID: 4320272.
- 33: Tisi GM, Wolfe WG, Fallat RJ, Nadel JA. Effects of O2 and CO2 on airway smooth muscle following

pulmonary vascular occlusion. J Appl Physiol. 1970 May;28(5):570-3. doi: 10.1152/jappl.1970.28.5.570. PMID: 4315146.

34: MORELLO A, COOPER IS. Cerebral lipiodol granuloma. Neurology. 1953 Dec;3(12):886-9. doi: 10.1212/wnl.3.12.886. PMID: 13154569.

35: LE BEAU J, PECKER J. Psycho-chirurgie; contrôle radiologique post-opératoire par la gélatine lipiodolée [Psychosurgery; postoperative radiological control by lipiodol gelatin]. Presse Med. 1950 Jul 5;58(43):777-8. Undetermined Language. PMID: 15440660.

From:

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

Permanent link:

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

Last update: **2024/06/07 02:55**

