

PerCryo™ Ablation

CLINICAL DATA REVIEW

2016



Renal Cryoablation

Author	Publication	Average Follow-Up (months)	Number of Patients	Radiographic Efficacy	Grade ≥3 Complications
Kim, <i>et al</i>	<i>J Urology</i> 2014 ¹	39	118	86%	3%
Breen, <i>et al</i>	<i>BJUI</i> 2013 ²	20	104	99%	11%
Duffey, <i>et al</i>	<i>J Endourology</i> 2012 ³	27	116	97%	2%
Altunrende, <i>et al</i>	<i>J Urology</i> 2011 ⁴	15	29	90%	N/A
Rodriguez, <i>et al</i>	<i>CVIR</i> 2011 ⁵	17	113	99%	3%
Atwell, <i>et al</i>	<i>J Urology</i> 2010 ⁶	26	80	95%	7%
Hinshaw, <i>et al</i>	<i>AJR</i> 2008 ⁷	15	30	100%	0%

Thoracic Cryoablation

Authors	Publication	Average Follow-Up (months)	Number of Patients	Local Control	Pneumothorax	Pneumothorax Requiring Chest Tube	Grade ≥ 3 Complications
<i>Moore, et al</i>	JVIR 2015 ⁸	51	45	85%	51%	15%	6%
<i>Yashiro, et al</i>	JVIR 2013 ⁹	19	71	76%	N/A	N/A	N/A
<i>Woodrum, et al</i>	RSNA 2013 ¹⁰	6	40	95%	50%	18%	6%
<i>Inoue, et al</i>	JVIR 2012 ¹¹	30	117	N/A	62%	11%	2%
<i>Yamauchi, et al</i>	PLoS ONE 2012 ¹²	29	22	97%	28%	5%	N/A
<i>Wang, Littrup, et al</i>	Radiology 2005 ¹³	12	187	83%	12%	8%	N/A

Palliative Intervention for Painful Bone Metastases

Author	Publication	Number of Patients	Freeze Time (Mins)	Pre-Procedure Pain	Post-Procedure Pain (Immediate)	Post-Procedure Pain (2-3 months)	Post-Procedure Pain (6 months)
<i>Tomasian, et al</i>	<i>AJNR 2016¹⁴</i>	14	10-5-10	8	3	3	-
<i>Calstrom, et al</i>	<i>Cancer 2013¹⁵</i>	61	10-8-10	4.7	3.5	2.1	0.9

Freezing of Nerve Tissue/Cryoanalgesia

Author	Publication	Number of Patients	Freeze Time (Seconds)	Pre-Procedure Pain	Post-Procedure Pain (Immediate)	Post-Procedure Pain (2-3 months)
Yoon, <i>et al</i>	<i>JVIR</i> 2016 ¹⁶	22	180	8.3	-	3.2
Moore, <i>et al</i>	<i>Acad Rad</i> 2010 ¹⁷	18	90	7.5	1.2	4.1

Liver Metastases Cryoablation

Author	Publication	Average Follow-Up (months)	Number of Patients	Local Control	Bleeding	Other Complications
<i>Xu, et al</i>	<i>WJG 2008¹⁸</i>	32	326	94%	1.5%	5%

References

- ¹Kim EH, Tanagho YS, Saad NE, Bhayani SB, Figenshau RS: Comparison of Laparoscopic and Percutaneous Cryoablation for Treatment of Renal Masses. *Urology* 2014; 83:1081-1087.
- ²Breen DJ, Bryant TJ, Abbas A, Shepherd B, McGill N, Anderson JA, Lockyer RC, Hayes MC, George SL: Percutaneous Cryoablation of Renal Tumours: Outcomes from 171 Tumours in 147 Patients. *BJU Int* 2013; 112:758-765.
- ³Duffey B, Nguyen V, Lund E, Koopmeiners JS, Hulbert J, Anderson JK: Intermediate-Term Outcomes after Renal Cryoablation: Results of a Multi-Institutional Study. *J Endourol* 2012; 26:15-20.
- ⁴Alturnde F, Autorino R, Hillyer S, Yang B, Laydner H, White MA, Khanna R, Isac W, Spana G, Stein RJ, Haber GP, O'Malley CM, Remer EM, Kaouk JH: Image Guided Percutaneous Probe Ablation for Renal Tumors in 65 Solitary Kidneys: Functional and Oncological Outcomes. *J Urology* 2011; 186:35-41.
- ⁵Rodriguez R, Cizman, Hong K, Koliatsos, Georgiades C: Prospective Analysis of the Safety and Efficacy of Percutaneous Cryoablation for pT1NxMx Biopsy-Proven Renal Cell Carcinoma. *Cardiovasc Intervent Radiol* 2011; 34:573-578.
- ⁶Atwell TD, Callstrom MR, Farrell MA, Schmidt GD, Woodrum DA, Leibovich BC, Chow GK, Patterson DE, Blute ML, Charboneau JW: Percutaneous Renal Cryoablation: Local Control at Mean 26 Months of Follow-Up. *J Urology* 2010; 184:1291-1295.
- ⁷Hinshaw JL, Shadid AM, Nakada SY, Hedican SP, Winter III TC, Lee Jr FT: Comparison of Percutaneous and Laparoscopic Cryoablation for the Treatment of Solid Renal Masses. *AJR* 2008; 191:1159-1168.
- ⁸Moore W, Talati R, Bhattacharji P, Bilfinger T: Five-Year Survival after Cryoablation of Stage I Non-Small Cell Lung Cancer in Medically Inoperable Patients. *J Vasc Interv Radiol* 2015; 26:312-319.
- ⁹Yashiro H, Nakatsuka S, Inoue M, Kawamura M, Tsukada N, Asakura K, Yamauchi Y, Hashimoto K, Kuribayashi S: Factors Affecting Local Progression after Percutaneous Cryoablation of Lung Tumors. *J Vasc Interv Radiol* 2013; 24:813-821.
- ¹⁰Woodrum DA, Debaere T, Abtin FG, Littrup PJ, Deschamps F, Suh RD, Aoun HD, Callstrom MR: Evaluating Cryoablation of Metastatic Lung/Pleura Tumors in Patients: Safety and Efficacy. *RSNA* 2013; Abstract VSI031-14.
- ¹¹Inoue M, Nakatsuka S, Yashiro H, Ito N, Izumi Y, Yamauchi Y, Hashimoto K, Asakura K, Tsukada N, Kawamura M, Nomori H, Kuribayashi S: Percutaneous Cryoablation of Lung Tumors: Feasibility and Safety. *J Vasc Interv Radiol* 2012; 23:295-302.
- ¹²Yamauchi Y, Izumi Y, Hashimoto K, Yashiro H, Inoue M, Nakatsuka S, Goto T, Anraku M, Ohtsuka T, Kohno M, Kawamura M, Nomori H: Percutaneous Cryoablation for the Treatment of Medically Inoperable Stage I Non-Small Cell Lung Cancer. *PLoS ONE* 2012; 7:e33223.
- ¹³Wang H, Littrup PJ, Duan Y, Zhang Y, Feng H, Nie Z: Thoracic Masses Treated with Percutaneous Cryotherapy: Initial Experience with More than 200 Procedures. *Radiology* 2005; 235:289-298.
- ¹⁴Tomasian A, Wallace A, Northrup B, Hillen TJ, Jennings JW: Spine Cryoablation: Pain Palliation and Local Tumor Control for Vertebral Metastases. *Am J Neuroradiol* 2016; 37:189-195.
- ¹⁵Callstrom MR, Dupuy DE, Soloman SB, Beres RA, Littrup PJ, Davis KW, Paz-Fumagalli R, Hoffman C, Atwell TD, Charboneau JW, Schmidt GD, Goetz MP, Rubin J, Brown KJ, Novotny PJ, Sloan JA: Percutaneous Image-Guided Cryoablation of Painful Metastases Involving Bone. *Cancer* 2013; 119:1033-1041.
- ¹⁶Yoon JHE, Grechushkin V, Chaudry A, Bhattacharji P, Durkin B, Moore W: Cryoneurolysis in Patients with Refractory Chronic Peripheral Neuropathic Pain. *J Vasc Interv Radiol* 2016; 27:239-243.
- ¹⁷Moore W, Kolnick D, Tan J, Yu HS: CT Guided Percutaneous Cryoneurolysis for Post-Thoracotomy Pain Syndrome. *Acad Radiol* 2010; 17:603-606.
- ¹⁸Xu KC, Niu LZ, He WB, Zuo JS: Percutaneous Cryosurgery for the Treatment of Hepatic Colorectal Metastases. *World J Gastroenterol* 2008; 14:1430-1436.



