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CLINICAL VIGNETTE

Use of Ultrasound for Removal of Tunneled Drainage Catheters

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Introduction

Tunneled thoracic pleural drainage catheters are occasionally difficult to remove due to difficulty locating the polyester cuff. We describe the use of ultrasound to accomplish this task efficiently and with a high degree of confidence.

Case Report

56-year-old female with a history of stage IV lung cancer presented to our center with a history of recurrent pleural effusion requiring indwelling tunneled drainage catheter placement eight months previously. Her pleural fluid output had become negligible and catheter removal was requested.

Upon evaluation, the site was clean and dry, without erythema, fluctuance or induration. The subcutaneous cuff was difficult to locate by palpation, due to its deep position within the subcutaneous tunnel. Ultrasound was employed to localize the Dacron cuff, and overlying skin was marked. The area was then prepped and draped in the usual sterile manner. Lidocaine was instilled for local anesthesia. A 1-cm incision was made over the Dacron cuff at the previously marked site. The cuff was dissected free and the catheter was removed in its entirety. The incision site was closed with skin adhesive, with good apposition of the incision edges. The exit site was left open to heal by secondary intention. There were no apparent complications. The patient tolerated the procedure well.

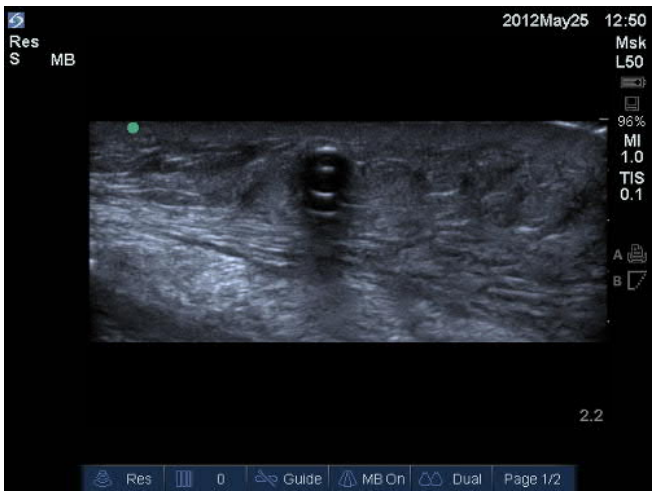
Discussion

Tunneled drainage catheters have proven useful and cost effective in managing recurrent malignant pleural effusions, and are increasingly considered an appropriate management alternative to bedside and thoracoscopic pleurodesis[1-20]. Though estimates vary widely between published case series, removal is ultimately indicated for 20%-70% of these catheters. Chances of pleurodesis may be improved with frequent catheter drainage[11]. Cellulitis, catheter blockage and empyema are rare indications for removal, and these complications are limited to 5% or less in most case series[2-3,5]. Life expectancy is quite limited in this patient population and the balance of patients typically retain the catheter until death.

Instructions for use of these catheters explicitly mention the difficulty that may be encountered removing the catheter if the polyester cuff is located more than one centimeter from the skin exit site[21]. Frequently in practice this distance is exceeded, and some dissection along the length of the catheter is required to locate the cuff.

We describe the use of ultrasound (L50 probe, Edge, Sonosite Inc., Bothell, Washington) to locate the cuff quickly and with a high degree of confidence, thereby minimizing the amount of dissection needed to locate and free the catheter cuff.

The image below demonstrates the appearance of the subcutaneous catheter body, outside the region of the cuff, on ultrasound. The inner and outer walls of the catheter are clearly visible.



In contrast, when the cuff itself is examined with ultrasound, the catheter wall is no longer distinct, and only a dark shadow is visible, as demonstrated in this image:

The utility of ultrasound for precise location of tunneled catheter cuffs has not been previously demonstrated in the literature to our knowledge. The sonographic equipment described in this report is thus widely available in clinics and hospitals where these catheters are placed and removed. We hope that this report will facilitate the safe and expeditious removal of indwelling tunneled pleural drainage catheters in cases where the cuff cannot be located by palpation.

REFERENCES

1. **Hunt BM, Farivar AS, Vallières E, Louie BE, Aye RW, Flores EE, Gorden JA**. Thoracoscopic talc versus tunneled pleural catheters for palliation of malignant pleural effusions. *Ann Thorac Surg*. 2012 Oct;94(4):1053-7; discussion 1057-9. doi: 10.1016/j.athoracsur.2012.01.103. Epub 2012 Apr 17. PubMed PMID: 22513274.
2. **Puri V, Pyrdeck TL, Crabtree TD, Kreisel D, Krupnick AS, Colditz GA, Patterson GA, Meyers BF**. Treatment of malignant pleural effusion: a cost-effectiveness analysis. *Ann Thorac Surg*. 2012 Aug;94(2):374-9; discussion 379-80. doi: 10.1016/j.athoracsur.2012.02.100. Epub 2012 May 10. PubMed PMID: 22579398; PubMed Central PMCID: PMC3783957.
3. **Warren WH, Kim AW, Liptay MJ**. Identification of clinical factors predicting Pleurx catheter removal in patients treated for malignant pleural effusion. *Eur J Cardiothorac Surg*. 2008 Jan;33(1):89-94. Epub 2007 Nov 5. PubMed PMID: 17983758.
4. **Putnam JB Jr**. Malignant pleural effusions. *Surg Clin North Am*. 2002 Aug;82(4):867-83. Review. PubMed PMID: 12472134.
5. **Haas AR, Sterman DH, Musani AI**. Malignant pleural effusions: management options with consideration of coding, billing, and a decision approach. *Chest*. 2007 Sep;132(3):1036-41. Review. PubMed PMID: 17873197.
6. **Lombardi G, Zustovich F, Nicoletto MO, Donach M, Artioli G, Pastorelli D**. Diagnosis and treatment of malignant pleural effusion: a systematic literature review and new approaches. *Am J Clin Oncol*. 2010 Aug;33(4):420-3. doi: 10.1097/COC.0b013e3181aacbbf. Review. PubMed PMID: 19858695.
7. **Demmy TL, Gu L, Burkhalter JE, Toloza EM, D'Amico TA, Sutherland S, Wang X, Archer L, Veit LJ, Kohman L**; Cancer and Leukemia Group B. Optimal management of malignant pleural effusions (results of CALGB 30102). *J Natl Compr Canc Netw*. 2012 Aug;10(8):975-82. PubMed PMID: 22878823.
8. **Van Meter ME, McKee KY, Kohlwes RJ**. Efficacy and safety of tunneled pleural catheters in adults with malignant pleural effusions: a systematic review. *J Gen Intern Med*. 2011 Jan;26(1):70-6. doi: 10.1007/s11606-010-1472-0. Epub 2010 Aug 10. Review. PubMed PMID: 20697963; PubMed Central PMCID: PMC3024099.
9. **Suzuki K, Servais EL, Rizk NP, Solomon SB, Sima CS, Park BJ, Kachala SS, Zlobinsky M, Rusch VW, Adusumilli PS**. Palliation and pleurodesis in malignant pleural effusion: the role for tunneled pleural catheters. *J Thorac Oncol*. 2011 Apr;6(4):762-7. doi: 10.1097/JTO.0b013e31820d614f. PubMed PMID: 21325982.
10. Cases E, Seijo L, Disdier C, Lorenzo MJ, Cordovilla R, Sanchis F, Lacunza M, Sevillano G, Benito-Sendín F. [Use of indwelling pleural catheter in the outpatient management of recurrent malignant pleural effusion]. Arch Bronconeumol. 2009 Dec;45(12):591-6. doi: 10.1016/j.arbres.2009.09.009. Epub 2009 Oct 29. Spanish. PubMed PMID: 19879036.
11. **Putnam JB Jr, Light RW, Rodriguez RM, Ponn R, Olak J, Pollak JS, Lee RB, Payne DK, Graeber G, Kovitz KL**. A randomized comparison of indwelling pleural catheter and doxycycline pleurodesis in the management of malignant pleural effusions. *Cancer*. 1999 Nov 15;86(10):1992-9. PubMed PMID: 10570423.
12. **Ohm C, Park D, Vogen M, Bendick P, Welsh R, Pursel S, Chmielewski G**. Use of an indwelling pleural catheter compared with thoracopic talc pleurodesis in the management of malignant pleural effusions. *Am Surg*. 2003 Mar;69(3):198-202; discussion 202. PubMed PMID: 12678474.
13. **Pollak JS, Burdge CM, Rosenblatt M, Houston JP, Hwu WJ, Murren J**. Treatment of malignant pleural effusions

with tunneled long-term drainage catheters. *J Vasc Interv Radiol*. 2001 Feb;12(2):201-8. PubMed PMID: 11265884.

14. **Thornton RH, Miller Z, Covey AM, Brody L, Sofocleous CT, Solomon SB, Getrajdman GI**. Tunneled pleural catheters for treatment of recurrent malignant pleural effusion following failed pleurodesis. *J Vasc Interv Radiol*. 2010 May;21(5):696-700. doi: 10.1016/j.jvir.2010.01.021. Epub 2010 Mar 21. PubMed PMID: 20307992.
15. **Roberts ME, Neville E, Berrisford RG, Antunes G, Ali NJ**; BTS Pleural Disease Guideline Group. Management of a malignant pleural effusion: British Thoracic Society Pleural Disease Guideline 2010. Thorax. 2010 Aug;65 Suppl 2:ii32-40. doi:10.1136/thx.2010.136994. PubMed PMID: 20696691.
16. **Antunes G, Neville E, Duffy J, Ali N**; Pleural Diseases Group, Standards of Care Committee, British Thoracic Society. BTS guidelines for the management of malignant pleural effusions. *Thorax*. 2003 May;58 Suppl 2:ii29-38. PubMed PMID: 12728148; PubMed Central PMCID: PMC1766015.
17. **Lee YC, Light RW**. Management of malignant pleural effusions. *Respirology*. 2004 Jun;9(2):148-56. Review. PubMed PMID: 15182263.
18. **Sioris T, Sihvo E, Salo J, Räsänen J, Knuuttila A** . Long-term indwelling pleural catheter (PleurX) for malignant pleural effusion unsuitable for talc pleurodesis. *Eur J Surg Oncol*. 2009 May;35(5):546-51. doi: 10.1016/j.ejso.2008.06.009. Epub 2008 Jul 21. PubMed PMID: 18644696.
19. **Light RW**. Pleural effusions. *Med Clin North Am*. 2011 Nov;95(6):1055-70. doi: 10.1016/j.mcna.2011.08.005. Epub 2011 Sep 25. Review. PubMed PMID: 22032427.
20. **MacEachern P, Tremblay A**. Pleural controversy: pleurodesis versus indwelling pleural catheters for malignant effusions. *Respirology*. 2011 Jul;16(5):747-54. doi: 10.1111/j.1440-1843.2011.01986.x. Review. PubMed PMID: 2154533.
21. http://www.carefusion.com/pdf/Interventional_Specialties/PleurX_Pleural_Placement_DFU.pdf

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