RESEARCH LETTER

Dynamic Parietal Closure: Initial Experience of an Original Parietal Closure Procedure for Treatment of Abdominal Wound Dehiscence

Abdominal wound dehiscence complicates between 0.2% and 10% of midline laparotomies[1] and is associated with significant morbidity and mortality (44% and 67%, respectively).[2,3] The surgeons who perform digestive surgery and plastic surgery at our institution have considered how to treat abdominal wound dehiscence. Given that preoperative risk factors cannot be modified in an emergency setting,[1,2] we added some specific plastic surgery procedures to the conventional parietal closure technique. We thus developed a "dynamic parietal closure" technique in which silicone loop sutures are used to strengthen a conventional aponeurotic closure. The procedure is simple, quick, inexpensive, and compatible with digestive stomas and complex peritoneal drainage. It has the advantages but not the disadvantages of the use of retention sutures or abdominal wall plastic surgery.[4]

Video available online at www.archsurg.com

Methods. Before dynamic parietal closure for the treatment of abdominal wound dehiscence is performed (video, http://www.archsurg.com), if any drains are in place, then externalization of the stoma(s), bowel replacement, and parietal disinfection are performed as usual.

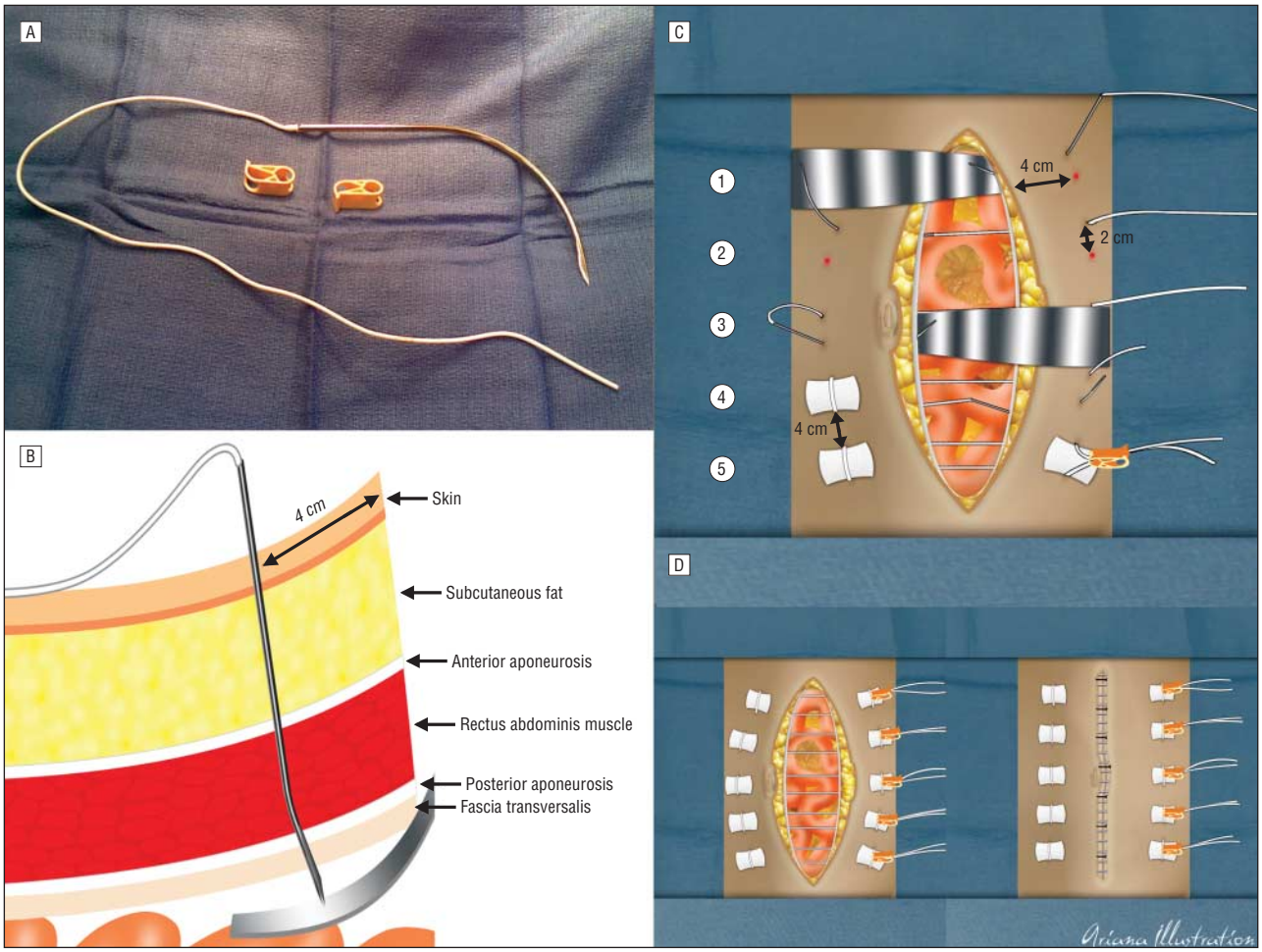

Figure. A, Elastic silicone loop screwed on the noncutting end of a needle (the locking system is yellow). B, The needle was passed transfascially across the wound 4 cm from the edge. The bowel was protected by a malleable blade. C, Description of the operative technique in 5 steps: (1) the needle was inserted 4 cm back from the wound edge on the right; (2) the needle was inserted on the wound edge on the left; (3) the needle was inserted again on the wound edge on the left (2 cm apart); (4) the needle was inserted at the initial wound edge, and a U-shaped suture was obtained; and (5) the system was maintained with the locking system, and compresses protected the skin. D, Once the system was in order, tension was adjusted to close the abdominal wall.

©2011 American Medical Association. All rights reserved.
Downloaded From: http://archsurg.jamanetwork.com/ on 05/06/2015

Table. Preoperative, Operative, and Postoperative Data on 16 Patients Who Underwent a Dynamic Parietal Closure Procedure

Data	Value
Before the procedure, median (range)	
Age, y	75 (25-88)
ASA score	3 (2-4)
French Society of Surgery score	2 (1-3)
BMI	26.2 (17.1-40.0)
Albumin, g/dL	23.8 (14.2-47.0)
Creatinine clearance, mL/min/1.73 m^2	51 (30-122)
Webster score	13 (2-26)
Mäkela score	2 (0-3)
Grade IIIb morbidity rate[a]	100.0
During the procedure, median (range)	
Operating time, min	60 (40-300)
U-shaped sutures, No.	6 (4-7)
After the procedure	
Overall postoperative morbidity rate[a]	1.5
Clavien scoring system, No. (%) of patients	
Grade 0	5 (31.3)
Grade I	1 (6.3)
Grade II	6 (37.5)
Grade IIIa	2 (12.5)
Grade IIIb	0 (0.0)
Grade IVa	2 (12.5)
Grade IVb	0 (0.0)
ICU stay, median (range), d	0 (0-16)
Hospital stay, median (range), d	18 (6-54)
Midline incisional hernia rate	25.0
Follow-up period, median (range), d	154 (17-377)

Abbreviations: ASA, American Society of Anesthesiologists; BMI, body mass index (calculated as weight in kilograms divided by height in meters squared); ICU, intensive care unit.

SI conversion factors: To convert albumin to grams per liter, multiply by 10; and to convert creatinine clearance to milliliters per second per meter squared, multiply by 0.0167.

[a] Using the Clavien scoring system for surgical complication: 0, no complication; I, deviation from normal postoperative course with no criteria for II, III, or IV; II, etiologic pharmacologic treatment; IIIa, interventional procedure without general anesthesia; IIIb, interventional procedure with general anesthesia; IVa, single-organ dysfunction requiring intensive care; and IVb, multiorgan dysfunction requiring intensive care.

At the time of parietal closure, successive mass closures were performed along the entire length of the median laparotomy with elastic silicone loops (45 cm in length and 2 mm in diameter [Ethiloop; Ethicon, Somerville, New Jersey]). Each loop was screwed onto the proximal end of a needle (as in drain externalization) and was placed transfascially across the wound to obtain a U-shaped suture every 4 cm.

Once the dynamic parietal closure technique has been performed along the entire length of the laparotomy, we adjusted the tension. This pushed back the digestive tract and closed the aponeurotic edges to yield a tension-free suture. The locking system comes from the Gripper Plus safety needle (Smith Medical, Brisbane, Australia).

We used a continuous, aponeurotic suture (PDS; Ethicon, Somerville, New Jersey).[5] The skin was closed conventionally. Lastly, the dynamic parietal closure's tension was adjusted, and compresses were placed between the skin and the loops (**Figure**).

The surgical site was examined every 48 hours, and the elastomer tension was adjusted so that constant force was applied. Abdominal dressings were positioned and changed conventionally until the laparotomy was dry. Abscesses were treated conventionally (vacuum therapy was feasible, if required). The surgeon removed the system 21 days later in the consultation room (by cutting and then pulling out the elastomer loops).

Results. We performed a prospective study of 873 consecutive patients who underwent a midline laparotomy during the period from January 2009 to December 2010. The overall incidence rate for abdominal wound dehiscence (diagnosed clinically within 2 weeks of the operation) was 2.06% (n=18), with incidence rates of emergency and planned abdominal wound dehiscence of 2.23% and 1.19%, respectively. In all cases of abdominal wound dehiscence, we performed an emergency procedure to redo the midline laparotomy, examine the abdominal cavity (to check for infection), and then perform the dynamic parietal closure technique. Two patients were excluded because they died in the hospital 18 and 20 days after surgery, respectively (mortality rate, 11.1%). Prospectively, we analyzed the data for 16 patients. The median Webster and Mäkela scores were 13 (range, 2-26) and 2 (range, 0-3), respectively. The etiology of abdominal wound dehiscence was mechanical in 12 patients and septic in 4 patients. The abdominal wound dehiscence recurrence rate was 0%. Specific and overall morbidity and mortality rates are shown in the **Table**. The midline incisional hernia rate was 25% (diagnosed clinically or on the basis of a computed tomographic scan) according to the medical literature criteria.[3] The median follow-up period was 157 days. Material costs never exceeded $27 per patient.

Comment. Dynamic parietal closure is an original, easy, inexpensive, and efficient procedure. It must be evaluated with larger numbers of patients. In individuals with a very high risk of abdominal wound dehiscence, the dynamic parietal closure technique could perhaps be performed preventively.

Quentin Qassemyar, MD
François Browet, MD
Micheline Robbe, MD, PhD
Pierre Verhaeghe, MD, PhD
Jean-Marc Regimbeau, MD, PhD

Author Affiliations: Departments of Plastic, Reconstructive, and Esthetic Surgery (Drs Qassemyar and Robbe) and General, Visceral, and Digestive Surgery (Drs Browet, Verhaeghe, and Regimbeau), Amiens North Hospital, University of Picardy Medical Center, Place Victor Pauchet, F-80054 Amiens CEDEX 01, France.

Correspondence: Dr Regimbeau, Department of General, Visceral, and Digestive Surgery, Amiens North Hospital, University of Picardy Medical Centre, Place Victor Pauchet, F-80054 Amiens CEDEX 01, France (regimbeau.jean-marc@chu-amiens.fr).

Author Contributions: *Study concept and design:* Qassemyar, Browet, Robbe, Verhaeghe, and Regimbeau. *Acquisition of data:* Qassemyar and Browet. *Analysis and interpretation of data:* Browet, Robbe, Verhaeghe, and

©2011 American Medical Association. All rights reserved.
Downloaded From: http://archsurg.jamanetwork.com/ on 05/06/2015

Regimbeau. *Drafting of the manuscript:* Qassemyar, Browet, and Verhaeghe. *Critical revision of the manuscript for important intellectual content:* Robbe and Regimbeau. *Administrative, technical, and material support:* Qassemyar and Browet. *Study supervision:* Robbe, Verhaeghe, and Regimbeau.

Financial Disclosure: None reported.

Online-Only Material: The video is available at http://www.archsurg.com.

1. Webster C, Neumayer L, Smout R, et al; National Veterans Affairs Surgical Quality Improvement Program. Prognostic models of abdominal wound dehiscence after laparotomy. *J Surg Res*. 2003;109(2):130-137.
2. Mäkelä JT, Kiviniemi H, Juvonen T, Laitinen S. Factors influencing wound dehiscence after midline laparotomy. *Am J Surg*. 1995;170(4):387-390.
3. van't RM, De Vos Van Steenwijk PJ, Bonjer HJ, Steyerberg EW, Jeekel J. Incisional hernia after repair of wound dehiscence: incidence and risk factors. *Am Surg*. 2004;70(4):281-286.
4. Marwah S, Marwah N, Singh M, Kapoor A, Karwasra RK. Addition of rectus sheath relaxation incisions to emergency midline laparotomy for peritonitis to prevent fascial dehiscence. *World J Surg*. 2005;29(2):235-239.
5. Veljkovic R, Protic M, Gluhovic A, Potic Z, Milosevic Z, Stojadinovic A. Prospective clinical trial of factors predicting the early development of incisional hernia after midline laparotomy. *J Am Coll Surg*. 2010;210(2):210-219.

COMMENTS AND OPINIONS

"Unnecessary" Postmastectomy Radiation Therapy

I read with great interest the review by Christante et al[1] and the thoughtful consideration of their work by Beatty.[2] Dr Beatty notes that more than half of the patients in the Christante et al group did not have a tumor size greater than 5 cm, nor did they have 4 or more positive nodes. On this basis, Beatty suggests that we should decrease "unnecessary" postmastectomy radiation therapy. I challenge their definition of "unnecessary" postmastectomy radiation therapy, which they received from the American Society of Clinical Oncology guidelines formulated in 2001. Both Christante et al and Beatty consider this to be the best approach.

The decision to administer postmastectomy radiotherapy is a complicated one. Recent literature has shown that T3N0 (>5 cm in size), which has long been an accepted indication for postmastectomy radiation therapy, is no longer considered to be appropriate in isolation.[3-6] Data from McCammon et al[5] support very high rates of recurrence of cancer after a mastectomy (40%) in premenopausal node-negative women with close surgical margins and lymphovascular invasion, despite small tumor size.[7-9] The 1 to 3 positive-node cohort in the early breast cancer trialist group's analysis showed an absolute decrease in the local recurrence rate of 11.6% and an absolute survival rate of 4.4% with radiotherapy.[10] The concept of nodal ratio identifies the highest risk among the 1 to 3 positive-node subgroup.[11,12] Molecular profiling into luminal A, luminal B, human epidermal growth factor receptor 2–enriched, and basal subtypes is also predictive of locoregional failure.[13,14] This information is likely to influence postmastectomy radiotherapy administration as the science evolves.

The dictum that either a tumor size greater than 5 cm or the presence of 4 or more positive nodes is an indication for postmastectomy radiation therapy is no longer valid. The National Comprehensive Cancer Network guidelines recognize this and give a "strongly considered" recommendation for postmastectomy radiation if the patient has 1 to 3 positive nodes.[15] The survival benefit conferred by radiation when local recurrence is prevented[10] demands that we critically evaluate the literature and offer radiotherapy appropriately, as our first priority, to prevent deaths due to breast cancer.

Suzanne B. Evans, MD, MPH

Author Affiliation: Department of Therapeutic Radiology, Smilow Cancer Hospital at Yale–New Haven, Connecticut.

Correspondence: Dr Evans, Department of Therapeutic Radiology, Smilow Cancer Hospital at Yale–New Haven, South Frontage Rd and Park St, Lower Level, New Haven, CT 06510 (suzanne.evans@yale.edu).

Financial Disclosure: None reported.

1. Christante D, Pommier SJ, Diggs BS, et al. Using complications associated with postmastectomy radiation and immediate breast reconstruction to improve surgical decision making. *Arch Surg*. 2010;145(9):873-878.
2. Beatty JD. Start by decreasing unnecessary postmastectomy irradiation. *Arch Surg*. 2010;145(9):878-879.
3. Floyd SR, Buchholz TA, Haffty BG, et al. Low local recurrence rate without postmastectomy radiation in node-negative breast cancer patients with tumors 5 cm and larger [published online ahead of print August 2, 2006]. *Int J Radiat Oncol Biol Phys*. 2006;66(2):358-364.
4. Taghian AG, Jeong JH, Mamounas EP, et al. Low locoregional recurrence rate among node-negative breast cancer patients with tumors 5 cm or larger treated by mastectomy, with or without adjuvant systemic therapy and without radiotherapy: results from five national surgical adjuvant breast and bowel project randomized clinical trials. *J Clin Oncol*. 2006;24(24):3927-3932.
5. McCammon R, Finlayson C, Schwer A, Rabinovitch R. Impact of postmastectomy radiotherapy in T3N0 invasive carcinoma of the breast: a Surveillance, Epidemiology, and End Results database analysis. *Cancer*. 2008;113(4):683-689.
6. Mignano JE, Gage I, Piantadosi S, Ye X, Henderson G, Dooley WC. Local recurrence after mastectomy in patients with T3pN0 breast carcinoma treated without postoperative radiation therapy. *Am J Clin Oncol*. 2007;30(5):466-472.
7. Jagsi R, Raad RA, Goldberg S, et al. Locoregional recurrence rates and prognostic factors for failure in node-negative patients treated with mastectomy: implications for postmastectomy radiation. *Int J Radiat Oncol Biol Phys*. 2005;62(4):1035-1039.
8. Rowell NP. Radiotherapy to the chest wall following mastectomy for node-negative breast cancer: a systematic review [published online ahead of print November 7, 2008]. *Radiother Oncol*. 2009;91(1):23-32.
9. Yildirim E, Berberoglu U. Can a subgroup of node-negative breast carcinoma patients with T1-2 tumor who may benefit from postmastectomy radiotherapy be identified [published online ahead of print March 29, 2007]? *Int J Radiat Oncol Biol Phys*. 2007;68(4):1024-1029.
10. Clarke M, Collins R, Darby S, et al; Early Breast Cancer Trialists' Collaborative Group (EBCTCG). Effects of radiotherapy and of differences in the extent of surgery for early breast cancer on local recurrence and 15-year survival: an overview of the randomised trials. *Lancet*. 2005;366(9503):2087-2106.
11. Truong PT, Olivotto IA, Kader HA, Panades M, Speers CH, Berthelet E. Selecting breast cancer patients with T1-T2 tumors and one to three positive axillary nodes at high postmastectomy locoregional recurrence risk for adjuvant radiotherapy. *Int J Radiat Oncol Biol Phys*. 2005;61(5):1337-1347.
12. Truong PT, Woodward WA, Thames HD, Ragaz J, Olivotto IA, Buchholz TA. The ratio of positive to excised nodes identifies high-risk subsets and reduces inter-institutional differences in locoregional recurrence risk estimates in breast cancer patients with 1-3 positive nodes: an analysis of prospective data from British Columbia and the M. D. Anderson Cancer Center [published online ahead of print February 22, 2007]. *Int J Radiat Oncol Biol Phys*. 2007;68(1):59-65.
13. Wo JY, Taghian AG, Nguyen PL, et al. The association between biological subtype and isolated regional nodal failure after breast-conserving therapy [published online ahead of print February 18, 2010]. *Int J Radiat Oncol Biol Phys*. 2010;77(1):188-196.
14. Nguyen PL, Taghian AG, Katz MS, et al. Breast cancer subtype approximated by estrogen receptor, progesterone receptor, and HER-2 is associ-

©2011 American Medical Association. All rights reserved.
Downloaded From: http://archsurg.jamanetwork.com/ on 05/06/2015