

November 2012

Sternal pain after rigid fixation: a pilot study of randomization rigid vs conventional wire closure.

Hitoshi Hirose
Thomas Jefferson University

Hong Mun Kong
Thomas Jefferson University

Shigeki Tabata
Thomas Jefferson University

Kentaro Yamane
Thomas Jefferson University

Margaret Lusardi
Thomas Jefferson University

Follow this and additional works at: <https://jdc.jefferson.edu/surgeryfp>
See next page for additional authors



Part of the [Surgery Commons](#)

[Let us know how access to this document benefits you](#)

Recommended Citation

Kong HM, Tabata S, Yamane K, Lusardi M, Bogar L, Guerraty A, Diehl JT, Hirose H. Sternal pain after rigid fixation: a pilot study of randomization rigid vs conventional wire closure. Presented at Chest 2012, Atlanta GA, October 20-25.

This Article is brought to you for free and open access by the Jefferson Digital Commons. The Jefferson Digital Commons is a service of Thomas Jefferson University's [Center for Teaching and Learning \(CTL\)](#). The Commons is a showcase for Jefferson books and journals, peer-reviewed scholarly publications, unique historical collections from the University archives, and teaching tools. The Jefferson Digital Commons allows researchers and interested readers anywhere in the world to learn about and keep up to date with Jefferson scholarship. This article has been accepted for inclusion in Department of Surgery Faculty Papers by an authorized administrator of the Jefferson Digital Commons. For more information, please contact: JeffersonDigitalCommons@jefferson.edu.

Authors

Hitoshi Hirose, Hong Mun Kong, Shigeki Tabata, Kentaro Yamane, Margaret Lusardi, Linda J. Bogar, and James Diehl

Sternal pain after rigid fixation: a pilot study of randomization rigid vs conventional wire closure.

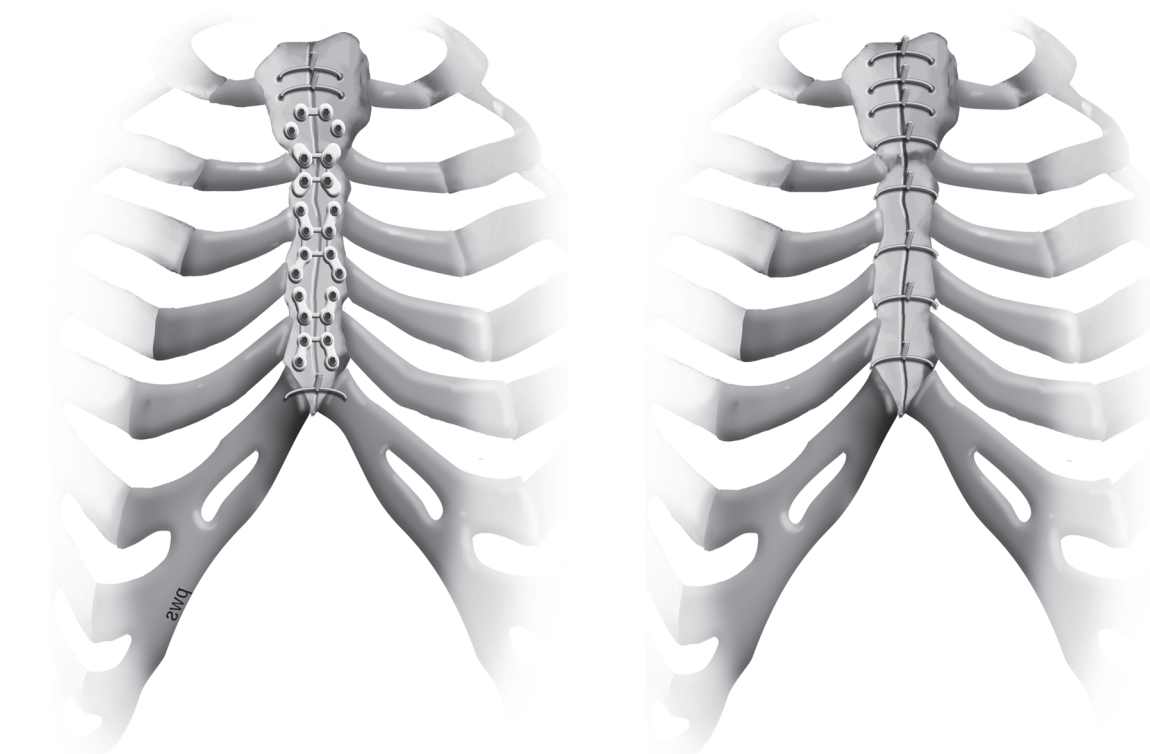
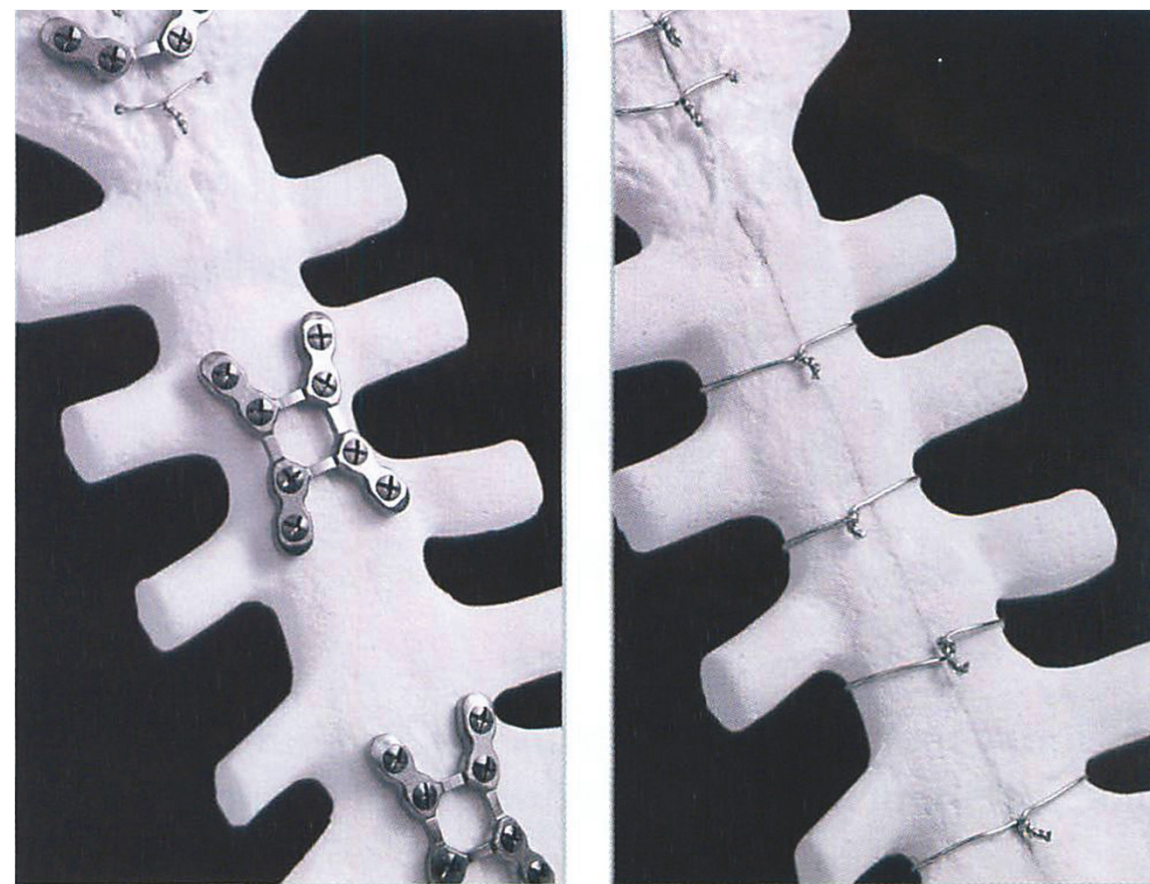
Hong Mun Kong, BS, Shigeki Tabata, MD, Kentaro Yamane, MD, Margaret Lusardi RN, Linda Bogar, MD, James T. Diehl, MD, Hitoshi Hirose, MD
 From Thomas Jefferson University Hospital, Philadelphia, PA, USA.

Objective

To investigate if rigid closure reduces sternal pain

Rigid

Wire



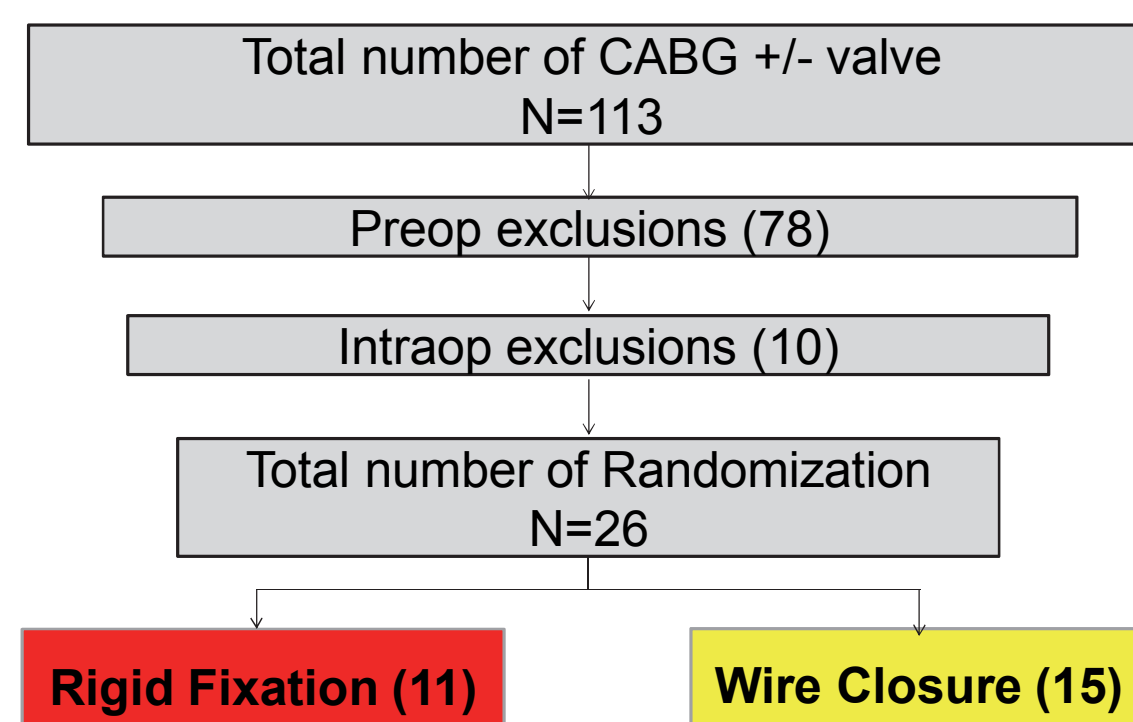
Methods

Prospective randomized CABG +/- valve
 Study period: 07/2011 – 1/2012
 Rigid fixation: n=11
 Wire closure: n=15

Pre-Op and Intra-Op Exclusions

Preop exclusions (78)	Intraop exclusions (10)
Age >80 (14)	Unexpected aortic surgery (1)
Emergency (6)	Osteoporosis (4)
Redo sternum (11)	Bleeding (5)
Hemodialysis (8)	
Hx of Osteoporosis (5)	
Radiation hx (1)	
Malignancy (5)	
Immunosuppression (2)	
Known coagulopathy (2)	
Infections, IE (5)	
Metal allergy (1)	
BMI above 40 (4)	
Compliance (4)	
Refusal (10)	

Randomization



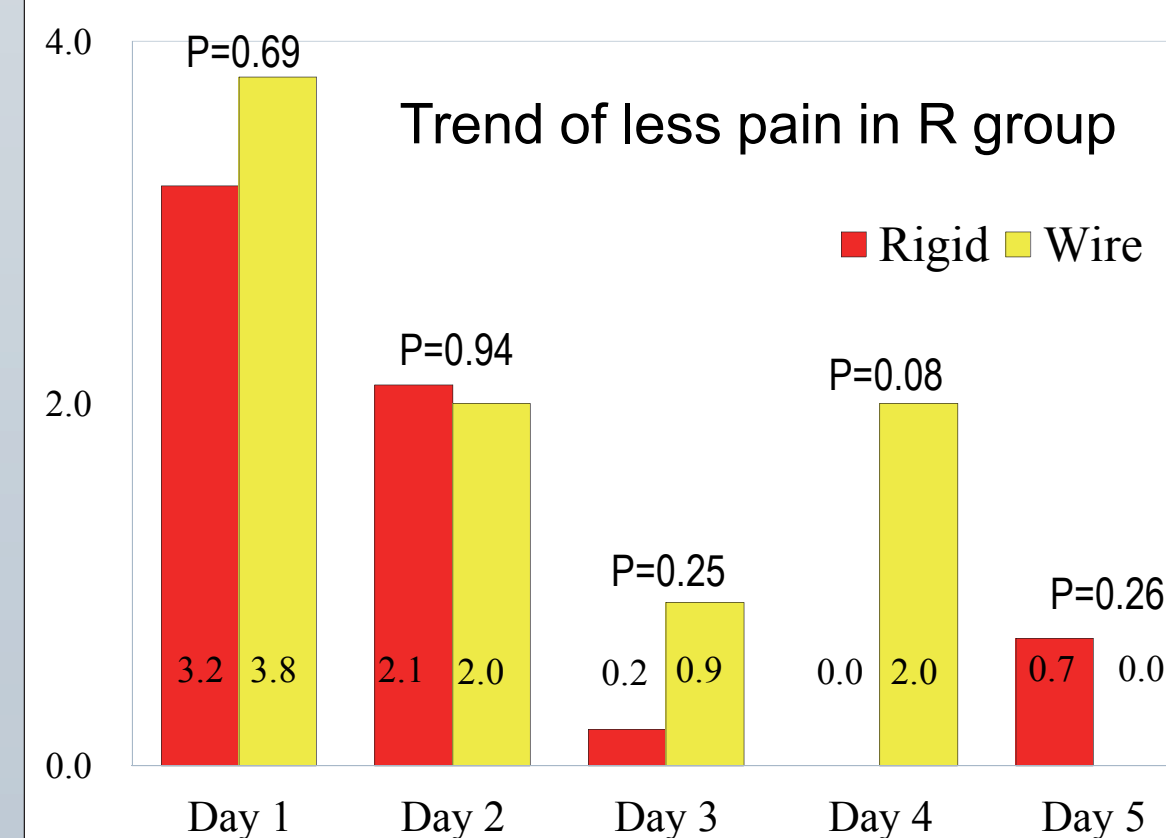
Patient Risk Factors

	Rigid	Wire	P
Age	67 ± 8	66 ± 10	0.78
Male	10 (91%)	13 (87%)	0.74
BMI	30 ± 6	28 ± 5	0.30
Poor EF (<40%)	1 (9.1%)	0	0.23
Diabetes	6 (55%)	5 (33%)	0.28
Insulin user	2 (18%)	4 (27%)	0.61
Smoking	5 (46%)	6 (40%)	0.78
PVD	1 (9.1%)	0	0.23
Cr above 1.5	1 (9.1%)	0	0.23
CABG	8 (73%)	13(87%)	0.37
Valve	5 (46%)	4 (27%)	0.32
CABG + Valve	2 (18%)	2 (13%)	0.74

Postop Outcomes

	Rigid	Wire	P
Intubation hours	7.3 ± 3.1	9.2 ± 7.2	0.37
Intubation >24 h	0	1 (6.7%)	0.38
ICU stay hours	55 ± 34	41 ± 24	0.26
ICU stay > 48h	5 (46%)	5 (33%)	0.53
Postop stay days	5.9 ± 2.0	6.3 ± 4.4	0.76
Postop stay >7d	1 (9%)	3 (20%)	0.45
Postop CVA	1 (9%)	0	0.23
Atrial Fibrillation	4 (36%)	6 (40%)	0.85
Superf sternal infection	0	1 (7%)	0.38
Deep sternal infection	1 (9%)	0	0.23
Pneumonia	0	0	0.99

Pain Score



Narcotic Requirement Dosage Calculation

24 hours narcotic requirement was calculated using the following formula and expressed in IV morphine equivalent

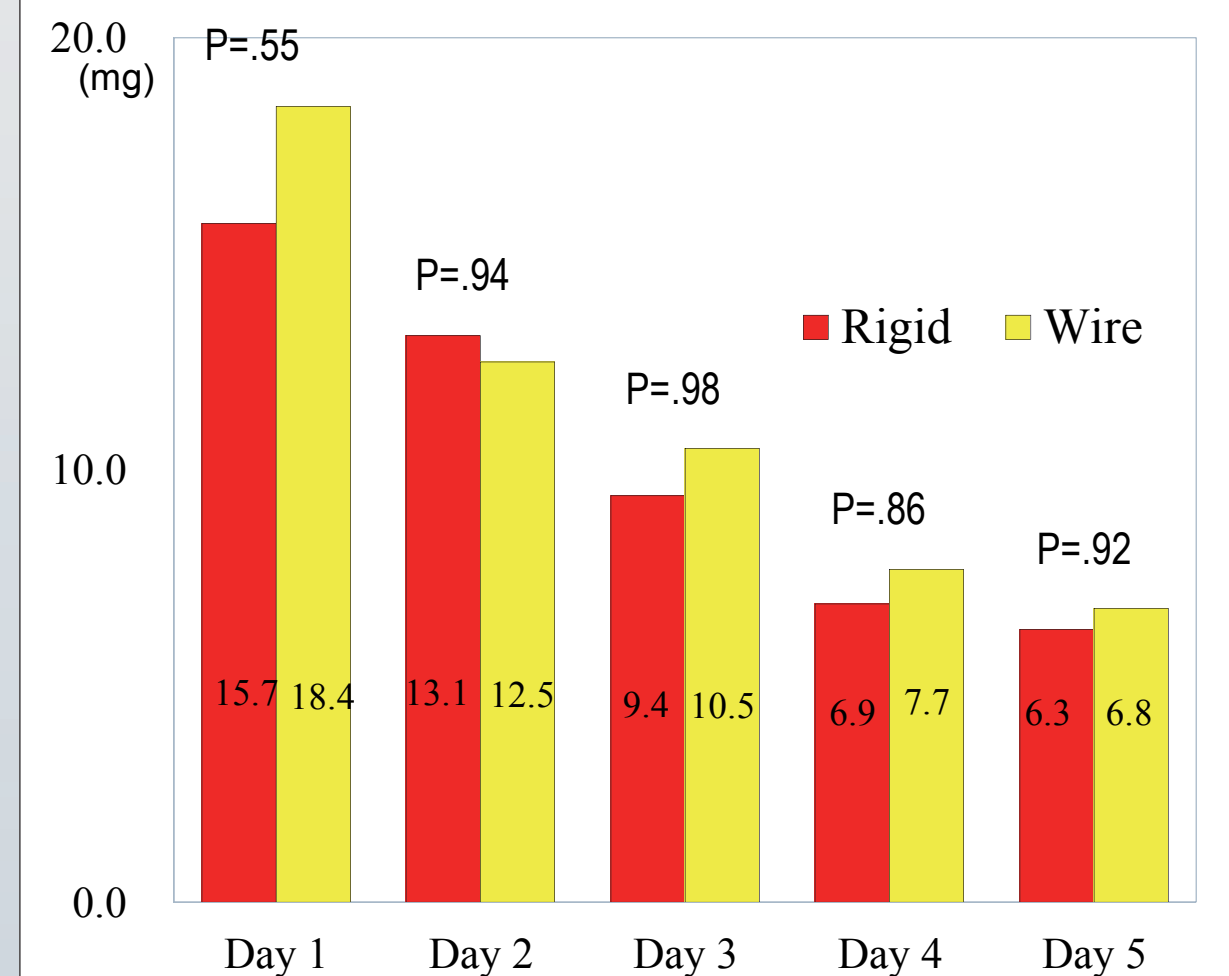
	IV	PO
Morphine	1mg	3mg
Hydromorphone	0.15mg	0.75mg
Percocet	N/A	3mg
Fentanyl	0.01mg (10mcg)	N/A

e.g.
 5 mg PO morphine is equianalgesic to 1.33mg IV morphine.
 2 mg PO hydromorphone is equianalgesic to 2.67mg IV morphine

Adapted from: Debria B. et al. Opioid equianalgesic calculations. J Palliative Med. 1999; 2: 209-218.

Total Narcotic Requirement

There was a trend of less narcotic requirement in group R



Conclusion

Randomized data showed a trend of fewer narcotic requirement in rigid fixation than in conventional wire closure.

Implications

Rigid fixation may potentially improve immediate sternal pain after open heart surgery.

Less narcotic requirement potentially facilitate early return to the normal activity. Larger population is required to justify study.

Contact information

Hitoshi Hirose, MD, Ph D.
 genex@nifty.com

Associate Professor of Surgery
 Division of Cardiothoracic Surgery
 Thomas Jefferson University