

# Costs Associated With Single-Use and Conventional Sets for Distal Radius Plating

Bryce Fugarino, MD,\* Mary Patricia Fox, MD,\* Cristina Terhoeve, MD,\* Nicholas Pappas, MD\*

**Purpose** Volar plating of distal radius fractures is an increasingly common procedure. Pre-sterilized, single-use volar plate fixation sets have been purported to increase operating room efficiency and decrease cost. The purpose of this study was to compare the actual cost of using a conventional set compared with the projected cost of using its single-use counterpart.

**Methods** We retrospectively analyzed 30 consecutive cases of volar plate fixation in which conventional instrument sets were used. Hardware and processing costs were calculated for the conventional sets and compared with the projected cost of using single-use sets.

**Results** The mean total cost of hardware and processing for the conventional sets was \$2,728, whereas the projected cost for the single-use sets was slightly higher at \$2,868. Twenty-three of the 30 cases would have required additional screws not available in the single-use set. The cost of the additional screws needed to supplement the single-use set would have added an average of \$282/case. Overall, the combined hardware and processing cost was lower for conventional sets in 25 of the 30 cases.

**Conclusions** Although the price of the single-use set is less than the mean charge for use of a conventional set, additional screws not available in the single-use set were required in 77% of cases and consequently rendered the conventional set cheaper in 83% of cases. Stocking the single-use sets with additional screws to reflect the most commonly used screw lengths could make these sets more cost effective in the future. (*J Hand Surg Am.* 2017; ■(■):1.e1-e4. Copyright © 2017 by the American Society for Surgery of the Hand. All rights reserved.)

**Type of study/level of evidence** Economic and decision analysis IV.

**Key words** Cost, distal radius fracture, single-use, volar plate.



**D**ISTAL RADIUS FRACTURES ARE THE second most common type of fracture in the Medicare population and the most common fracture of the upper extremity.<sup>1,2</sup> Currently, over 85,000 Medicare beneficiaries sustain distal radius fractures each year, a number that is rising.<sup>3</sup> Not only are the numbers of these fractures increasing, but increasingly surgical fixation is the preferred treatment modality.

Matilla et al<sup>4</sup> found that the rate of operative treatment for distal radius fractures more than doubled from 1998 to 2008. A Swedish study found a 3.6-fold increase in volar plating for these fracture types from 2005 to 2010, with the greatest change seen in the group aged 50 to 74 years.<sup>5</sup> In 2007, total Medicare costs for the treatment of distal radius fractures were \$170 million; the mean payment was \$3,832 for

From the \*Department of Orthopaedic Surgery, Louisiana State University Health Sciences Center, New Orleans, LA.

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**Corresponding author:** Bryce Fugarino, MD, Department of Orthopaedic Surgery, Louisiana State University Health Sciences Center, 1542 Tulane Avenue, Box T6-7, New Orleans, LA 70401; e-mail: [bfugarino@gmail.com](mailto:bfugarino@gmail.com).

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internal fixation and \$1,429 for closed reduction. Although a relatively small portion of total health care costs, it has been estimated that Medicare costs could reach \$240 million annually if this trend of treating distal radius fractures with operative fixation continues.<sup>3</sup>

The increase in surgical fixation seems to be related to advancements in volar plating technique and technology. Over the past 2 decades, the development of fixed-angle locking screws provided more secure fixation, which is particularly advantageous in osteoporotic bone.<sup>6,7</sup> Although volar plating has been shown to allow patients to return to work earlier than both external fixation and percutaneous pinning, a detailed evaluation of implant costs for different volar plating fixation options has not yet been performed.<sup>8,9</sup>

To decrease operating room costs and increase efficiency, single-use fixation sets have been devised. The ePAK (Biomet, Warsaw, IN) was recently introduced as a presterilized, individually wrapped version of its conventional DVR Crosslock Distal Volar Radius Plating System. The ePAK includes plates, screws, Kirschner wires, a depth gauge, and a drill bit. These single-use sets are offered in 7 different screw–plate configurations based on plate width and length. The number of screws varies based on plate size. Cost savings are purported to be realized by potentially eliminating instrument processing fees and increasing efficiency via reducing instrument setup and cleanup time by decreasing the amount of sets used per case. The purpose of this study was to compare the hardware cost of using a conventional set compared with the projected hardware cost of using its single-use counterpart.

## MATERIALS AND METHODS

After we received institutional research board exemption, we retrospectively reviewed all distal radius fractures treated with volar plating by the senior author (N.P.) at a level 1 trauma center between February 2015 and December 2015. In all cases, conventional Biomet DVR Crosslock Distal Volar Radius Plating System sets were used. Exclusion criteria included cases requiring additional fixation, such as a dorsal plate or external fixator. A convenience sample was used consisting of 30 consecutive patients treated within this time frame who met inclusion criteria. Billing sheets were obtained and analyzed for overall cost and use of hardware. Negotiated facility discounts were disregarded when calculating cost to revert dollar amounts to retail

price. Hardware used in these cases was compared with available hardware in the single-use sets to determine whether the single-use set contained all necessary hardware or whether additional hardware would have been required. The comparative single-use set corresponded to the plate size selected in each case. The actual cost of using the conventional set versus the projected cost of using the single-use set was calculated. This was done by adding the cost of additional hardware that was not available in the single-use set to the retail price of the single-use set. Unicortical locking screws were used to fix the distal fracture fragments. An average of 11 screws were used per case. The availability of corresponding screws was checked for each screw placed using the conventional set. When required screw lengths were unavailable in the single-use sets, the cost of each individually packaged screw was added to the case. Our facility's sterile processing department determined costs estimated associated with decontamination, washing, inspection, wrapping, and autoclaving of conventional sets to be \$75/tray. The total cost of hardware and processing was used to determine overall expected costs' difference between systems. The projected cost of the single-use set was calculated for each case and compared with the actual cost of the conventional set using a paired *t* test. We used the Fisher exact test to compare the proportion of cases in which the projected cost was lower for the conventional set compared with the single-use set. Statistical significance was set at  $P < .05$ .

## RESULTS

Mean total cost, inclusive of hardware and processing cost, per case for the conventional set was \$2,728 (range, \$2,425 to \$3,035; SD, \$165). The retail price for the single-use set was \$2,650, which corresponded to an initial \$78 cost savings. However, these results did not account for additional hardware needed to supplement the single-use sets. Hardware supplementation was required in 23 of the 30 cases (77%). The mean cost of hardware supplementation was \$282/case. When the cost of additional hardware was included in the total cost of using single-use sets, the mean cost rose to \$2,868 (range, \$2,650 to \$3,485; SD, \$184), resulting in an average \$140 increase (95% confidence interval, \$65.80 to \$214) in cost compared with conventional sets ( $P < .05$ ) (Fig. 1). In all cases requiring additional hardware, appropriate length screws were unavailable and thus necessitated the use of individually sterilized and wrapped screws. The most commonly needed

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