Absorbable Poliglecaprone 25 Sutures for Both Subcutaneous and Transepidermal Closure: A Cosmetically and Economically Appealing Option

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The majority of dermatologic surgeons close surgical defects using absorbable sutures to approximate deep subcutaneous tissue and nonabsorbable sutures to close the epidermal tissue. However, the absorbable monofilament poliglecaprone 25 can serve as the sole suture material in closing deep surgical defects involving subcutaneous and epidermal tissue with the benefits of providing aesthetically pleasing outcomes, possibly due to the material's low tissue reactivity and clear colorless appearance, and cost-effectiveness. We discuss the estimated cost savings per procedure when using poliglecaprone 25. Additional advantages include increased versatility, ease of handling, and convenience. Some disadvantages include a slight stiffness of the suture material, which may require a surgeon to make minor adjustments to his/her knot tying technique, as well as a transparent appearance that may make suture removal more challenging when using the undyed version of the suture material. However, the many benefits of using poliglecaprone 25 for closure of surgical defects outweigh the few disadvantages.

The traditional approach to closure of a surgical defect involves use of absorbable sutures to approximate deep subcutaneous tissue and nonabsorbable sutures to close the epidermal tissue. However, if the absorbable material is able to maintain sufficient tensile strength to keep the epidermal portion of the wound edges in close approximation for the standard 5- to 14-day period prior to suture removal, there may be no need to use additional nonabsorbable sutures. For more than a decade, the author (C.Y-H.) has used the absorbable monofilament poliglecaprone 25 as her sole suture material for both subcutaneous and transepidermal closure. It not only provides exceptional cosmetic results but also results in remarkable cost savings.

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Dr. Yag-Howard is an advisory board member and consultant for Ethicon, Inc. Ms. Lavallee reports no conflicts of interest in relation to this article.

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CHOOSING SUTURE MATERIAL

A study by Adams et al[1] revealed that the absorbable suture materials used by 61 dermatologic surgeons surveyed are polyglactin 910 (73%), poliglecaprone 25

(11%), polyglycolic acid (5.5%), polydiaxanone (5.5%), poliglyconate (4%), and fast-absorbing gut (2%). Traditionally, absorbable suture materials are used only to provide strength in the closure of the subcutaneous portion of a surgical defect, while nonabsorbable materials are used for final approximation of the wound edges.[2] However, the concept of using one absorbable suture material to close a surgical defect both subcutaneously and transepidermally is not entirely new.

In 1998, Fosko and Heap[3] reported positive results in investigations using polyglactin 910, poliglecaprone 25, and plain catgut sutures for what they referred to as full-thickness closures. They also reported positive experiences in their own use of polyglactin 910 for both subcutaneous and transepidermal closure, noting no adverse events or detectable differences in wound healing.[3] In 2010, Rosenzweig et al[4] compared the use of absorbable poliglecaprone 25 to nonabsorbable polypropylene for transepidermal closures and noted equal cosmetic outcomes. Both reports indicated cost savings by using a total of 1 package of absorbable sutures to complete the entire closure versus the more traditional method of using 1 package each of absorbable and nonabsorbable sutures to complete the closure.[3,4] Fosko and Heap[3] indicated a cost savings of 50% per reconstruction when using polyglactin 910 as the sole suture material; however, the degree of potential cost savings using poliglecaprone 25 alone was not specified.

ESTIMATED COST SAVINGS

For the purpose of estimating the cost savings of using poliglecaprone 25 as the sole suture material in surgical defect reconstruction, one can assume, as is typical in our experience, that only 1 package of poliglecaprone 25 is needed for complete closure; one also can assume that the dermatologic surgeon who uses both absorbable and nonabsorbable sutures uses only 1 package of each and uses 1 of the 2 most common nonabsorbable suture materials, nylon or polypropylene.[5]

We contacted 3 independent national distributors of suture materials and obtained highly variable price quotes for a box of each of the following suture materials (all using 4-0 PS-2 needle): nylon (Ethilon), polypropylene (Prolene), poliglecaprone 25 (Monocryl and Monocryl Plus), and polyglactin 910 (Vicryl and Vicryl Plus)(all manufactured by Ethicon, Inc). We also obtained the manufacturer's list price for these products.

Table 1 depicts the surprisingly great cost variability among boxes of sutures (12 packages per box), with price quotes from 3 national suture distributors compared to the manufacturer's list price. The data suggest surgeons are wise to compare costs for potential savings.

In Table 2, the average price per package of each of the sutures identified in Table 1 was calculated from the average price per box (12 packages per box) using the quotes from the 3 national distributors. These figures then were used to calculate the estimated cost savings per surgical procedure assuming that only 1 package of poliglecaprone 25 was used as the sole suture material to close the entire surgical defect versus a combination of absorbable and nonabsorbable sutures. Based on the average quoted price from the 3 national distributors, the potential cost savings per procedure are between $8.49 and $15.77. Based on the manufacturer's list price, the potential cost savings per procedure are between $4.13 and $12. Therefore, if a surgeon performs 1200 surgeries per year, he/she could save between $10,188 and $18,924 annually based on average distributor quotes or between $4956 and $14,400 per year based on the manufacturer's list price simply by using 1 package of poliglecaprone 25 rather than 1 package each of an absorbable and nonabsorbable suture combination.

ADDITIONAL ADVANTAGES

Since 1999, the author (C.Y-H.) has used absorbable monofilament poliglecaprone 25 for both subcutaneous and transepidermal closure in virtually all patients with surgical defects (approximately 1200 surgical defects annually). In addition to cost savings, poliglecaprone 25 offers several other advantages versus nonabsorbable suture materials for transepidermal closure, including increased versatility, low tissue reactivity, a clear colorless appearance, a low coefficient of friction for smooth and easy handling, convenience, time efficiency, and an aesthetically pleasing outcome.

Poliglecaprone 25 allows the dermatologic surgeon to exercise versatility in closure techniques. The surgeon has the option of placing the surface sutures either subcutaneously using a running technique or transepidermally using, for example, an interrupted, mattress, running, or running mattress technique. The low tissue reactivity of poliglecaprone 25 means wounds heal well with a low incidence of inflammation. The clear and colorless nature of the suture means that the transepidermal stitches are cosmetically appealing and are neither obvious nor disturbing to the patient (Figure). When placed using a running subcutaneous technique, the low coefficient of friction makes suture placement relatively effortless. Additionally, the material's absorbable composition means that the running subcutaneous stitches are not removed but rather dissolve after surgery. Therefore, the patient does not need to be inconvenienced by returning for suture removal, and the time nurses normally dedicate to suture removal also is decreased. Additionally, the wound

Table 1

Per Box[a] Cost Comparison Between National Distributor Price Quotes and MLP of Select Suture Materials[b]

Suture Material (Product Name)[c]	Code	Cost Per Box, $ Distributor 1[d]	Distributor 2[e]	Distributor 3[f]	Average Quoted Price	MLP	Difference[g]
Nonabsorbable							
Nylon (Ethilon)	1667G	234.29	84.65	171.00	163.31	101.25	62.06
Polypropylene (Prolene)	8682G	211.49	110.74	186.00	169.41	132.46	36.95
Absorbable							
Poliglecaprone 25 (Monocryl)	Y496G	242.62	121.55	197.00	187.06	145.40	41.66
Poliglecaprone 25 plus (Monocryl Plus)	MCP496G	240.29	131.27	249.00	206.85	157.03	49.82
Polyglactin 910 (Vicryl)	J496G	178.29	88.11	170.00	145.47	105.40	40.07
Polyglactin 910 plus (Vicryl Plus)	VCP496G	203.29	95.16	N/A	149.23	113.83	35.40

Abbreviations: MLP, manufacturer's list price; N/A, not available.
[a]12 packages per box.
[b]Prices based on quotes obtained on June 12, 2013.
[c]All using 4-0 PS-2 needle. All suture materials manufactured by Ethicon, Inc.
[d]Henry Schein, Inc.
[e]Suture Express, Inc.
[f]Moore Medical.
[g]Difference between average quoted price and MLP.

Immediate postoperative appearance of a surgical site closed using poliglecaprone 25 sutures placed in a running fashion. The suture material is clear and colorless.

is supported by the running subcutaneous suture for a longer period of time than nonabsorbable running subcutaneous sutures, which typically are removed within 2 weeks.

MINOR DISADVANTAGES

Some minor disadvantages of poliglecaprone 25 are the stiffness of the suture and its transparent appearance. Poliglecaprone 25 is stiffer than nylon or polypropylene, which initially can make knot tying somewhat difficult; however, this difficulty can be overcome by placing 4 single throws or 1 double throw followed by 3 single throws to tie the surgical knot rather than the common practice of placing 1 double throw followed by 2 single throws

Table 2

Estimated Cost Per Surgical Procedure When Using 1 Package Each of Absorbable and Nonabsorbable Suture Versus 1 Package of Absorbable Suture Alone[a]

Suture Material (Product Name)[b]	Estimated Cost Per Procedure Based on Average Quoted Price,[c,d] $	Estimated Cost Per Procedure Based on MLP,[c,e] $
1 Package Each of Absorbable and Nonabsorbable Suture		
Nylon (Ethilon) + poliglecaprone 25 (Monocryl)	29.20	20.55
Nylon (Ethilon) + poliglecaprone 25 plus (Monocryl Plus)	30.85	21.52
Nylon (Ethilon) + polyglactin 910 (Vicryl)	25.73	17.22
Nylon (Ethilon) + polyglactin 910 plus (Vicryl Plus)	26.05	17.92
Polypropylene (Prolene) + poliglecaprone 25 (Monocryl)	29.71	23.16
Polypropylene (Prolene) + poliglecaprone 25 plus (Monocryl Plus)	31.36	24.12
Polypropylene (Prolene) + polyglactin 910 (Vicryl)	26.24	19.82
Polypropylene (Prolene) + polyglactin 910 plus (Vicryl Plus)	26.55	20.52
1 Package Absorbable Suture Alone		
Poliglecaprone 25 (Monocryl)	15.59	12.12
Poliglecaprone 25 plus (Monocryl Plus)	17.24	13.09

Abbreviation: MLP, manufacturer's list price.
[a]Estimates based on assumption that 1 package of absorbable and 1 package of nonabsorbable sutures or 1 package of absorbable sutures alone are used to close surgical defect.
[b]All suture materials manufactured by Ethicon, Inc.
[c]Potential cost savings calculated by subtracting cost of most expensive poliglecaprone suture from least expensive absorbable and nonabsorbable suture combination to obtain the lowest potential cost savings, and by subtracting cost of least expensive poliglecaprone suture from most expensive absorbable and nonabsorbable suture combination to obtain highest potential cost savings.
[d]The estimated cost savings per procedure based on the average quoted price is $8.49 (ie, $25.73−$17.24) to $15.77 (ie, $31.36−$15.59).
[e]The estimated cost savings per procedure based on MLP is $4.13 (ie, $17.22−$13.09) to $12 (ie, $24.12−$12.12).

with nylon or polypropylene. Additionally, the knot has to be given a securing tug prior to cutting the suture that extends from the knot. We have found that as surgeons gain experience using this material, the nuances associated with knot tying become second nature. Additionally, it can be difficult to see poliglecaprone 25 because of its colorless transparent nature, which can make suture removal challenging. However, we believe patients prefer the transparency of this material because the surgical site is less of an eyesore compared to those closed with more obvious black sutures. For those surgeons who prefer a colored suture, poliglecaprone 25 also is available with a violet dye.

CONCLUSION

When used as the sole suture material for both subcutaneous and transepidermal closure, poliglecaprone 25 provides an aesthetically and economically appealing alternative to using both absorbable and nonabsorbable sutures to close surgical defects. Although surgeons may

be required to make minor adjustments in their surgical techniques, it is our experience that adapting to the use of poliglecaprone 25 is not difficult and the cosmetic and economic rewards make it worthwhile.

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