Communication from the Technology Assessment Committee

TECHNOLOGY STATUS EVALUATION REPORT

ASGE

Polypectomy devices

The ASGE Technology Committee provides reviews of existing, new, or emerging endoscopic technologies that have an impact on the practice of gastrointestinal endoscopy. Evidence-based methodology is employed, using a MEDLINE literature search to identify pertinent clinical studies on the topic and a MAUDE (Food and Drug Administration Center for Devices and Radiological Health) database search to identify the reported complications of a given technology. Both are supplemented by accessing the "related articles" feature of PubMed and by scrutinizing pertinent references cited by the identified studies. Controlled clinical trials are emphasized, but in many cases data from randomized controlled trials are lacking. In such cases, large case series, preliminary clinical studies, and expert opinions are utilized. Technical data are gathered from traditional and Web-based publications, proprietary publications, and informal communications with pertinent vendors.

Technology Status Evaluation Reports are drafted by 1 or 2 members of the ASGE Technology Committee, reviewed and edited by the committee as a whole, and approved by the Governing Board of the ASGE. When financial guidance is indicated, the most recent coding data and list prices at the time of publication are provided. For this review the MEDLINE database was searched through January 2007 for articles related to "polypectomy" and "colonoscopy" crossed with "snare," "bipolar snare," "biopsy," "hot biopsy," "endoloop," "submucosal injection," and "hemoclip."

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BACKGROUND

Mucosal polyps are commonly discovered during endoscopic evaluation of the GI tract. Adenomatous polyps are at risk for progression to carcinoma, hence their identification and removal is a primary goal of endoscopy. Polyps come in a wide variety of shapes and sizes, and may be positioned in challenging locations for removal. A variety of techniques and devices are available to the endoscopist to accomplish the safe removal of polyps. Familiarity with available polypectomy devices is important for their optimal selection and safe use. This status evaluation will describe the devices and the agents available for the performance of endoscopic polypectomy.

TECHNOLOGY UNDER REVIEW

The goals of polypectomy generally include both representative sampling and the safe removal or ablation of the entire lesion. Sampling can be performed via prior cold biopsy, concurrent biopsy and ablation, or retrieval of tissue after excision. Polyp removal can be accomplished via "cold" mechanical cutting without the use of cautery or with concurrent application of electrocautery for ablation and hemostasis. The electrosurgical generators used for the performance of polypectomy were recently reviewed.[1] A number of technologies and numerous devices are available for polypectomy (Appendix, Tables 1 and 2). Electrosurgical polypectomy devices attach to electrosurgical generators with several different active cord-connector designs. When purchasing electrosurgical snares and hot biopsy forceps (HBF), one must ensure compatibility of components.

Biopsy forceps

Biopsy forceps used for polypectomy include both standard "cold" biopsy devices and "hot biopsy" devices that serve as an electrode for simultaneous tissue biopsy and electrocautery. Both varieties are sold as single-use or reusable devices. Cold biopsy forceps have been reviewed in separate documents: Endoscopic Tissue Sampling Devices[2] and Tissue Sampling and Analysis.[3]

Polypectomy with HBF theoretically provides improved hemostasis and more complete ablation of the neoplastic tissue. Both monopolar and bipolar variants have been described. Monopolar forceps, which are most common, use the application of electrocautery via the 2 biopsy cups in contact with the polyp, with the return current passing through the patient's body to a distant return electrode or a ground pad. The most effective technique is to grasp the polyp superficially in the forceps, tent the mucosa,

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and judiciously apply energy to achieve a white coagulum adjacent to the forceps. In the bipolar design, the 2 opposing cups of the forceps serve as opposite electrodes, such that electrocautery is primarily applied to the tissue caught within the bite of the device, and its penetration within neighboring tissue is extremely shallow.

Snares

Polypectomy snares incorporate a monopolar wire loop electrode that is advanced beyond a plastic insulating catheter to encircle the target tissue, which is then transected via mechanical and electrosurgical cutting as the loop is withdrawn into the catheter. Snares are made of monofilament or braided wires of various gauges. The catheters vary in caliber and length to accommodate application through all lengths and calibers of endoscope channel. All snares are designed for use with electrocautery, but either hot or cold techniques can be used with any device. Small or mini monofilament snares are commonly used in the cold technique. Both single-use and reusable varieties are available. Snares are made in a wide variety of sizes and shapes designed to match the anatomic requirements for ensnaring a given lesion. Endoscopic bipolar snares have been designed and studied but are not readily available.[4]

Rotatable snares allow the assistant to change the orientation of the wire loop relative to the lesion.[5] Barbed- and needle-tip snares facilitate positioning and grasping of tissue at the base of polyps. Combination devices incorporating snares with injection needles or other modalities are being designed.

Agents for submucosal injection

Submucosal injection of a liquid medium can elevate the target lesion to facilitate removal and to limit the depth of thermal injury to the gut wall by increasing the distance between burn and serosa. Saline solution cushions rapidly disperse into neighboring tissue planes, hence, a variety of injectable agents, including 50% dextrose, glycerol, dilute hyaluronic acid, and methylcellulose, have been evaluated for their ease of injection and duration of cushion effect.[6,7] Other occasional additives include epinephrine for hemostasis and methylene blue for demarcation of the polyp margins.[8]

Dextrose 50% is readily available and produces a longer-lasting submucosal bleb than saline solution.[9] In a comparative study of agents for submucosal injection during the performance of esophageal EMR, the dispersal and the loss of an appreciable submucosal cushion was compared for saline solution, saline solution plus epinephrine, 50% dextrose, 10% glycerine and 5% fructose, and 1% hyaluronic acid.[7] The ''disappearance time'' was significantly shorter for saline solution and saline solution plus epinephrine compared with all other agents. Hyaluronic acid was retained far longer (median, 22 minutes) than all other agents. Subsequent studies of hydroxypropyl methylcellulose yielded prolonged disappearance times similar to those for hyaluronic acid (36-38 minutes).[6]

Ancillary devices

Ancillary devices for the performance of polypectomy include retrieval accessories for efficient capture of multiple polyp fragments after colonoscopic polypectomy,[10,11] injection needles,[12] hemostasis clips,[13] detachable snares,[14] mucosal resection caps,[15] and varied ablation accessories (eg, monopolar and bipolar probes,[16] argon coagulation devices[17,18] and lasers).[19] A number of these devices are further reviewed in other technology status evaluation reports.[11-13,15,17,19]

Argon coagulation is a noncontact method of delivering high-frequency monopolar current through ionized and electrically conductive argon gas. Currently, 2 endoscopic systems are available (Conmed, Utica, NY, and ERBE USA, Marietta, Ga). Argon electrocautery devices are commonly used for ablation of neoplastic tissues, including residual tissue after performance of piecemeal polypectomy or EMR.

Devices designed to ensure hemostasis include endoscopic clips and the detachable loop ligating device. Clips and endoloops have been used to clamp or to ensnare the base or the stalk of large polyps before and after polypectomy. Clips are also used to close mucosal defects after resection. Several proprietary clip designs are available in preloaded and nonloaded versions.[20] The detachable loop-ligating device is a nylon noose with a sliding hub that can be cinched to reduce and fix the size of the loop. They are available in 20-mm and 30-mm loop sizes, and are delivered and positioned via a catheter of varied sheath lengths. A loop cutter is available for removing part or all of deployed loops.

EFFICACY AND SAFETY

Endoscopic polypectomy is nearly universally effective for pedunculated lesions but is highly size, technique, and experience related for sessile lesions. Data on the efficacy and risks of polypectomy related to individual techniques are cited below, where available. In 1 study, snare polypectomy of 68 colon polyps larger than 30 mm achieved complete resection in 1 procedure for 82% of sessile lesions and for all of the pedunculated lesions.[21]

Overall, postpolypectomy hemorrhage has been noted in 0.85% to 2.7% of all polypectomies,[22-25] with the majority being delayed in presentation[26] and the minority requiring transfusions.[27] Electrocoagulation injury to the bowel wall has been reported to induce a transmural burn in approximately 0.51% to 1.2% of patients undergoing polypectomy, often resulting in the ''postpolypectomy syndrome'' of localized inflammation and pain, without evidence of perforation.[28,29] In an effort to avoid this effect, polypectomy with pure-cutting current was studied.[30]

A bleeding rate comparable with that seen with the use of coagulation or blended current was noted, provided that hemoclip placement can be used readily, as needed.

There does not appear to be a risk-based size limit for polypectomy, though postpolypectomy bleeding is more common (12%-24%) after removal of large lesions with standard techniques.[21,31] Almost all bleeding episodes are manageable by endoscopic techniques. Evolving techniques for EMR of broad flat lesions are beyond the scope of this review and have recently been addressed.[15]

Biopsy forceps

Removal of diminutive polyps (<5 mm) via single or serial cold biopsies is attractive because of the perceived safety of the technique; however, concerns exist regarding adequacy of polyp ablation. In 1 study of cold biopsy excision of diminutive colon polyps, 29% of patients had residual neoplastic tissue detected 3 weeks after treatment.[32] Similarly, in a study of 62 diminutive polyps treated by HBF, 17% had persistent viable polyp tissue on repeat endoscopic evaluation 2 weeks after therapy.[33]

In a canine study, monopolar HBF caused transmural injury significantly more often than did bipolar HBF (44% vs 5%, respectively).[34] A porcine study of injury from various polypectomy devices showed that the HBF yielded consistently deeper tissue injury than that produced with a snare.[35] Hot biopsy polypectomy may carry greater risk in the right colon, because 17 of 19 perforations identified in a survey of complications occurred in this region.[3,36] Factors that seemed to impact the frequency of complications were the degree and the length of current application. However, a series of 907 small polyps (2-8 mm) removed with HBF in 460 patients showed no complications.[37]

Snares

There are limited data on the outcomes of polypectomy when using the various snare techniques and designs. Cold snare polypectomy of 288 diminutive polyps was performed without complication in 210 patients without coagulopathy.[38] Mini-snares (11-13 mm wide), used with or without electrocautery, proved effective in removing 94% of small (2-7 mm) polyps in 90 patients. There was 1 major hemorrhage (0.5%) after polypectomy, without use of electrocautery.[39] Of note, 12% of the tissue specimens were not retrieved. Compared with snares of standard design, rotatable snares were found to ease polyp snaring and to reduce procedure time.[5]

Submucosal injection

A porcine study showed that submucosal injection of saline solution significantly reduced the proportions of lesions with deep tissue injury from argon coagulation and thermal probes. However, injection did not alter the deep tissue injury after HBF.[40] Several clinical reports have documented the safety and the utility of saline-solution–assisted polypectomy.[14,41-43] In a randomized controlled trial of epinephrine injection before removal of 100 polyps >1 cm in diameter in 69 patients, only 1 of 50 bled after treatment vs 8 of 50 without injection ($P < .05$).[8] In a study that compared injectants for endoscopic removal of large sessile colorectal polyps, glycerol yielded more complete resections (45.5% vs 25%) and more en bloc resections (64% vs 49%) than did saline solution, used in the historical control patients.[44]

Bacteremia associated with saline-solution–assisted polypectomy has been reported.[45] Animal studies have suggested that some injectants may cause local tissue inflammation[25] or may induce tumor growth,[27] but the clinical relevance of these observations is uncertain.

Ionized argon coagulation

Ionized argon coagulation of known or potential residual adenoma after polypectomy has been shown to significantly reduce[28,46] or have no effect[29] on the rate of persistent adenoma at follow-up examination. Although efficient and apparently safer than alternative means for ablating residual adenomatous tissue, argon coagulation therapy has a potential for transmural injury and perforation.[17]

Clips and loops

Endoscopic clips have been used with a goal of preventing immediate and delayed postpolypectomy bleeding. They have been applied to the stalk of polyps before resection or after polyp removal.[47] However, randomized studies of clip application after EMR of gastric lesions or polypectomy of colon polyps have found no benefit.[48]

In a prospective randomized trial that compared snare polypectomy to endoloop-aided snare resection of large pedunculated polyps in 87 patients, the endoloop yielded a significant reduction in postpolypectomy bleeding (12% vs 0%; $P < .05$).[14]

FINANCIAL CONSIDERATIONS

The Current Procedural Terminology (CPT) codes for colonoscopy and polypectomy are referenced in Table 1. In general, when 1 polyp or multiple polyps are treated at the time of colonoscopy, 1 code is reported to reflect 1 technique. However, if different techniques are utilized

TABLE 1. CPT codes for performance of polypectomy

	CPT code
Colonoscopy with biopsy, single or multiple	45380
Colonoscopy with removal of lesions by hot biopsy	45384
Colonoscopy with removal of lesions by snare	45385
Colonoscopy with ablation of lesions not by hot biopsy/snare	45383
Colonoscopy with injection of any substance	45381
Sigmoidoscopy with biopsy, single or multiple	45331
Sigmoidoscopy with removal of lesions by hot biopsy	45333
Sigmoidoscopy, flexible; with directed submucosal injection(s), any substance	45335
Sigmoidoscopy with removal of lesions by snare	45338
Sigmoidoscopy with ablation of lesions by other means	45339
Small intestinal endoscopy, enteroscopy beyond second portion of duodenum, not including ileum; with biopsy, single or multiple	44361
Small intestinal endoscopy, enteroscopy beyond second portion of duodenum, not including ileum; with removal of tumor(s), polyp(s), or other lesion(s) by snare technique	44364

to remove different lesions at different sites, different primary and secondary codes can be reported, utilizing -59 modifier on the second or subsequent code. Likewise, if submucosal injection is performed (45381), it can be separately reported as a secondary procedure, again with -59 modifier.

The prices of both single use and reusable devices have dropped considerably in recent years. Managers must decide whether to use disposable or reusable accessories in their respective units. A recent technology report on single-use devices provides guidance regarding considerations of cost, reprocessing, and frequency of use.[49]

CONCLUSION

There is a wide variety of devices available for endoscopic polyp sampling, removal, or ablation. The development of new techniques and accessories has led to the safe application of polypectomy for a broader group of patients with larger and more difficult lesions.[50] Ongoing review and familiarity with advances in polypectomy devices and techniques will benefit the practicing endoscopist.

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APPENDIX

TABLE 1. Polypectomy devices: hot biopsy forceps

Manufacturer	Name/design	Spiked	Working length (cm)	Cup opening size (mm)	Cup diameter (mm)	Minimum channel size (mm)	Price (US$)+
Olympus							
Single Use	Alligator Jaw-Step; Standard Oval	No	230	6.5 mm		2.8	$73.00
Reusable	Hot Biopsy Forceps	No	165-300	7.5, 8.0		2.8, 3.7	$390.00
							$565.00
Wilson-Cook							
Single Use	Captura, Hot	No	230		2.4	2.8	$64.20
Reusable	Maxum @, Hotmaxx @	Both	160, 230		1.8, 2.5	2, 2.8	361-422
Boston Scientific							
Single Use	Radial Jaw 3 @	No	240		2.2	2.8	$80.00
Reusable	None						
US Endoscopy							
Single Use	Oval/00711211 (Olympus Active Cord)	No	230	8.0		2.8	$82.50
	Alligator/00711212 (Olympus A/C)	No	230	8.0		2.8	$82.50
	Oval/00711213 (Microvasive A/C)	No	230	8.0		2.8	$82.50
	Oval/00711295 (Olympus A/C)	No	350	8.0		2.8	$90.00
Reusable	Oval/00711303 (Microvasive A/C)	No	230	8.0		2.8	$300.00
	Oval/00711305 (Olympus A/C)	No	230	8.0		2.8	$300.00
	Alligator/00711306 (Olympus A/C)	No	230	8.0		2.8	$300.00
Conmed (Bard)							
Single Use	Oval, Alligator	No	230		2.3	2.8	$96
Reusable	None						
Ballard (Kimberly Clark)							
Single Use	Thermal Option II @	Both	160-240		Standard and Large Oval	2.3	$29.00ea
	Hot Biopsy Forceps	Both	230			2.8	$18.00ea
Reusable	None						

TABLE 2. Polypectomy devices: snares

Manufacturer	Device (design-shape)	Working length (cm)	Loop diameter (mm)	Sheath size (mm or Fr)	Wire diameter (mm)	Minimum channel size (mm)	Price (US$)
Olympus	Oval Snare	230	10		0.47	2.8	$24.00
	Oval Snare	230	15		0.47	2.8	$24.00
	Oval Snare	230	25		0.47	2.8	$24.00
	Cresent Snare	165	25		0.3	2	$32.50
	Cresent Snare	230	25		0.3	2	$32.50
	PolyLoop	230	30			2.8	$95
	Spiral Snare	230	20		0.48	2.8	$32.50
	Soft Oval Snare	230	10		0.4	2.8	$24.00
	Soft Oval Snare	230	15		0.4	2.8	$24.00
	Soft Oval Snare	230	25		0.4	2.8	$24.00
	Oval Snare	165	25		0.47	2.8	$445.00
	Oval Snare	230	25		0.47	2.8	$445.00
	Oval Snare	300	25		0.47	2.8	$670 (special order)
	Oval Snare	165	25		0.43	2.8	$445.00
	Oval Snare	230	25		0.43	2.8	$445.00
	Mini Oval Snare	165	15		0.47	2.8	$445.00
	Mini Oval Snare	230	15		0.47	2.8	$445.00
	Mini Oval Snare	230	15		0.43	2.8	$445.00
	Mini Oval Snare						
	Barbed Snare	165	25		0.43	2.8	$615.00
	Barbed Snare	230	25		0.43	2.8	$615.00
	Mini Barbed Snare						
	Mini Barbed Snare	230	15		0.43	2.8	$615.00
	Cresent Snare	165	22		0.4	2.8	$360
	Cresent Snare	230	22		0.4	2.8	$360
	Cresent Snare	190	23		0.3	2	$360
	Hexagonal	165	22		0.4	2.8	$360.00
	Hexagonal	230	22		0.4	2.8	$360.00
	Hexagonal	190	23		0.3	2	$360.00
	Endo-Loop						
	Endo-Loop						
	Loop Cutter	165				2.8	$515
	Loop Cutter	195				2.8	$515
	Loop Cutter	230				2.8	$515
Wilson-Cook	Sonnet Short throw snare, oval	240	1.5 × 30	7F		2.8	$37
	Sonnet Short throw snare, mini oval	240	25 × 55	7F		2.8	$37
	Sonnet Short throw snare, jumbo oval	240	30 × 60	7F		2.8	$37
	Sonnet Short throw snare, Hexagonal	240	30 × 45	7F		2.8	$37
	Acusnare Minioval	240	15 × 30	7F		2.8	$22.90
	Acusnare Standard Oval	240	25 × 55	7F		2.8	$22.90
	Acusnare Jumbo Oval	240	30 × 60	7F		2.8	$22.90
	Acusnare Mini hexagonal	240	15 × 25	7F		2.8	$25.20
	Acusnare Hexagonal	240	30 × 45	7F		2.8	$25.20
	Soft Acusnare micro mini oval	240	10 × 15	7F		2.8	$22.90
	Soft Acusnare mini oval	240	15 × 30	7F		2.8	$22.90
	Soft Acusnare standard oval	240	25 × 55	7F		2.8	$22.90
	Soft Acusnare jumbo oval	240	30 × 60	7F		2.8	$22.90
	Soft Acusnare mini hexagonal	240	15 × 25	7F		2.8	$25.20
	Soft Acusnare hexagonal	240	30 × 45	7F		2.8	$25.20
	Acusnare Duckbill 15 mm	240	15 mm	7F		2.8	$52.50
	Acusnare Duckbill 25 mm	240	25 mm	7F		2.8	$52.50
	Acusnare Needle Tip	240	25 x 55	7F		2.8	$27.30
Boston Scientific	Rotatable Micro Oval	195	13	2.4		2.4	$39.00
	Rotatable Mini-Standard Oval	195	20	2.4		2.4	$39.00
	Sensation Short Throw Jumbo	240	30	2.4		2.4	$36.70
	Sensation Short Throw Standard	240	27	2.4		2.4	$25.00
	Sensation Short Throw Micro oval	240	13	2.4		2.4	$25.00
	Sensation Jumbo Oval Medium Stiff Wire	240	30	2.4		2.4	$36.70
	Sensation Standard Oval Medium Stiff Wire	240	27	2.4		2.4	$36.70
	Sensation Micro Oval Medium Stiff Wire	240	13	2.4		2.4	$36.70
	Sensation Crescent	240	27	2.4		2.4	$36.70
	Captiflex Standard Oval	240	27	2.4		2.4	$25.00
	Captiflex Micro Oval	240	13	2.4		2.4	$25.00

(*continued on next page*)

TABLE 2 (*continued*)

Manufacturer	Device (design-shape)	Working length (cm)	Loop diameter (mm)	Sheath size (mm or Fr)	Wire diameter (mm)	Minimum channel size (mm)	Price (US$)
	Captiflex Mini-micro oval	240	11	2.4		2.4	$35.95
	Captivator Jumbo Oval	240	30	2.4		2.4	$35.95
	Captivator Micro Oval	240	13	2.4		2.4	$35.95
	Captivator Standart Oval	240	27	2.4		2.4	$35.95
	Captivator Hexagonal	240	27	2.4		2.4	$35.95
	Captivator Crescent	240	27	2.4		2.4	$35.95
	Captivator Thin-wire Jumbo oval	240	30	2.4		2.4	$35.95
	Captivator Micro-hex	240	13	2.4		2.4	$35.95
	Profile Pediatric Mini Micro Oval	240	11	1.9		1.9	$39.00
	Profile Pediatric Micro Oval	240	13	1.9		1.9	$39.00
	Profile Pediatric Wide oval	240	27	1.9		1.9	$39.00
US Endoscopy	Anchor Tip™ oval	230	25	2.2	0.45	2.8	$29.50
	Rotator™ standard oval (Olympus A/C)	230	25	2.2	0.45	2.8	$31.00
	Rotator™ standard oval (MV A/C)	230	25	2.2	0.45	2.8	$31.00
	Rotator™ mini oval (Olympus A/C)	230	15	2.2	0.45	2.8	$31.00
	Rotator™ mini oval (MV A/C)	230	15	2.2	0.45	2.8	$31.00
	Short Throw mini oval (Olympus A/C)	230	15	2.2	0.45	2.8	$25.00
	Short Throw standard oval (Olympus A/C)	230	25	2.2	0.45	2.8	$25.00
	Short Throw standard oval (MV A/C)	230	25	2.2	0.45	2.8	$25.00
	Short Throw standard oval (Olympus A/C)	350	25	2.2	0.45	2.8	$30.00
	iSnare™ injection therapy* and snare (Olympus A/C)	230	25	3.0	0.45	3.2	$125.00
	Polyp Pack™ oval Rotator™ snare & Roth Net® polyp retriever (Olympus A/C)	230	25	2.5	0.45	2.8	$85.00
	dSnare™ diminutive polypectomy and retrieval system	230	9	3.0	0.30	3.2	$65.00
Conmed (Bard)	Singular Medium Crescent Firm Wire	230	24	2.3		2.8	$36.50
	Singular Medium Hexagonal Firm Wire	230	25	2.3		2.8	$36.50
	Singular Large Oval Firm Wire	230	32	2.3		2.8	$36.50
	Singular Medium Oval Firm Wire	230	23	2.3		2.8	$36.50
	Singular Small Oval Firm Wire	230	16	2.3		2.8	$36.50
	Singular X-Small Oval Firm Wire	230	11	2.3		2.8	$36.50
	Singular Large Oval Soft Wire	230	32	2.3		2.8	$36.50
	Singular Medium Oval Soft Wire	230	23	2.3		2.8	$36.50
	Singular Small Oval Soft Wire	230	16	2.3		2.8	$36.50
	Singular X-Small Oval Soft Wire	230	11	2.3		2.8	$36.50
	Optimizer Large Oval Firm Wire	230	32	2.3		2.8	$31.50
	Optimizer Medium Oval Firm Wire	230	23	2.3		2.8	$31.50
	Optimizer Small Oval Firm Wire	230	16	2.3		2.8	$31.50
	Optimizer X-small Oval Firm Wire	230	11	2.3		2.8	$31.50
	Optimizer Large Oval Soft Wire	230	32	2.3		2.8	$31.50
	Optimizer Medium Oval Soft Wire	230	23	2.3		2.8	$31.50
	Optimizer Small Oval Soft Wire	230	16	2.3		2.8	$31.50
	Optimizer X-small Oval Soft Wire	230	11	2.3		2.8	$31.50
Ballard (Kimberly Clark)	DS II Medium Hexagonal	240				2.3	$16.00ea
	DS II Large Hexagonal	240				2.3	$16.00ea
	DS II Jumbo Hexagonal	240				2.3	$16.00ea
	DS II Small Oval	240				2.3	$16.00ea
	DS II Medium Oval	240				2.3	$16.00ea
	DS II Large Oval	240				2.3	$16.00ea
	DS II Small Crescent	240				2.3	$16.00ea
	DS II Medium Crescent	240				2.3	$16.00ea
	DS II Large Crescent	240				2.3	$16.00ea
	DS II Large Oval Cup	240				1.8	$16.00ea
	Lariat II Small Oval	240				2.3	$16.00ea
	Lariat II Medium Oval	240				2.3	$16.00ea
	Lariat II Large Oval	240				2.3	$16.00ea
	Kimberly-Clark Small Oval	240				2.3	$16.00ea
	Kimberly-Clark Medium Oval	240				2.3	$16.00ea
	Kimberly-Clark Large Oval	240				2.3	$16.00ea
	Kimberly-Clark Crescent Loop	240				2.3	$16.00ea
	Kimberly-Clark Hexagonal	240				2.3	$16.00ea
	Kimberly-Clark Small Oval	170				1.66	$16.00ea
	Kimberly-Clark Medium Oval	170				1.66	$16.00ea
	Kimberly-Clark Large Oval	170				1.66	$16.00ea

(*continued on next page*)

TABLE 2 (*continued*)

Manufacturer	Device (design-shape)	Working length (cm)	Loop diameter (mm)	Sheath size (mm or Fr)	Wire diameter (mm)	Minimum channel size (mm)	Price (US$)
Hobbs Medical	Crescent	220 cm	50 x 25	2.3 mm		2.8	$17.50ea
	Standard	220 cm	50 x 25	2.3 mm		2.8	$17.50ea
	Mini	220 cm	35 x 20	2.3 mm		2.8	$17.50ea
	Micro	220 cm	25 x 15	2.3 mm		2.8	$17.50ea
Pediatric Scope	Oval	220 cm	50 x 25	1.8 mm		2.3	$25.00ea