Communication from the ASGE Technology Committee

TECHNOLOGY STATUS EVALUATION REPORT

Short-wire ERCP systems

To promote the appropriate use of new or emerging endoscopic technologies and those technologies that affect endoscopic practice, the ASGE Technology Committee presents relevant information to practicing physicians in the form of Technology Reviews. An evidence-based method is used, wherein a MEDLINE literature search is performed to identify pertinent clinical studies on the topic, a MAUDE (FDA Center for Devices and Radiological Health) database search is performed to identify the reported complications of a given technology, and both are supplemented by accessing the "related articles" feature of PubMed and by scrutiny of pertinent references cited by identified studies. Controlled clinical trials are emphasized, but in many cases data from randomized controlled trials are lacking, in which case large case series, preliminary clinical studies, and expert opinion are used. Technical data are gathered from traditional and Web-based publications, proprietary publications, and informal communications with pertinent vendors. Documents are drafted by 1 or 2 committee members, reviewed and edited by the committee as a whole, and approved by the Governing Board of the ASGE. When financial guidance is appropriate, the most recent coding data and list prices at the time of publication are provided.

For this review, the MEDLINE database was searched through October 2006 for articles related to ERCP by using the keywords "ERCP" and "accessories" plus "sphincterotome" and "cannulation." Practitioners should continue to monitor the medical literature for subsequent data about the efficacy, safety, and socioeconomic aspects of these technologies.

The proprietary technologies in this review are described in the order in which they were introduced into the market.

BACKGROUND

In recent years, MRCP and EUS have largely replaced diagnostic ERCP, which is now primarily a therapeutic procedure.[1] Since the inception of ERCP, improvement in accessories to achieve cannulation and expand therapeutic capabilities have been sought to facilitate a successful outcome. Guidewires have become essential in maintaining access and controlling the exchange of devices (sphincterotomes, balloons, cytology brushes, stents, etc) for therapeutic ERCP.[2] Recently, initial wire access has been proposed to facilitate entry into the desired duct and as an alternative to traditional cannulation techniques.[3,4] Perceived limitations to the "long-wire" systems include (1) need for greater time and precise coordination between the physician and assistant during device exchanges and therapeutic maneuvers, (2) increased fluoroscopy time, (3) propensity to lose access, (4) dependence on a well-trained assistant, and (5) limited physician control of the guidewire. Several different "short-wire" ERCP systems have been designed in an attempt to overcome these limitations and permit the endoscopist to independently manipulate the guidewire.

TECHNOLOGY UNDER REVIEW

Traditional ERCP techniques use wires that are longer than the endoscope channel plus the length of the accessories that are passed over them. This has been required to maintain duct access and manual control of the wire at all times. To overcome the cited disadvantages, advances in wire-locking mechanisms and catheter technology have permitted the development of short-wire systems. Although each of the proprietary systems differs in their exact mechanisms, the short-wire ERCP systems share three independent elements: (1) a means of locking the wire in position during device exchange, (2) devices designed to be exchanged over short wires while maintaining access, and (3) wires with lengths of 185 to 270 cm (compared with traditional long wires of 400-460 cm). Currently, 3 short-wire ERCP systems are commercially available. In general, the proprietary systems of guidewires and devices are interchangeable; however, some wire markings and wire locks are more compatible with their respective guidewires and specific device designs.

Wire lock, device designs, and device exchange

The available wire locks enable fixation of the wire either externally at the biopsy port or internally at the elevator. Either approach enables exchange of devices over a short guidewire. External lock designs use proprietary

0016-5107/$32.00
doi:10.1016/j.gie.2007.05.030

suction port caps, either separately or integrated with the wire lock. The internal lock design is dependent on the ''reactive force'' of the wire against a closed proprietary V-shaped elevator.

The devices used with the external lock designs use a leading ''short-track'' wire lumen of 5 to 50 cm with or without a longer ''tear-away'' lumen that allows conversion of the wire path from long to short track. Short-track devices without a tear-away lumen can be advanced over a locked wire or together with the leading end of the wire. In devices with a tear-away lumen, the wire initially passes through the entire length of the device. The proximal portion of the guidewire lumen has either a thin wall or is partially open to allow the wire to be stripped laterally out of the channel, allowing for physician control of the wire and permitting external locking of the wire during device exchange. The external lock design permits fixation of the wire during all maneuvers except the limited insertion or withdrawal of the leading short-track portion of the device past the biopsy port.

The internal lock design allows the use of any short- or long-wire device. With this design the wire is locked during device passage through the working channel, but whenever devices are passed beyond the elevator, traditional assistant control of the wire is required. During exchange maneuvers, the device is withdrawn into the endoscope channel above the elevator by use of traditional exchange techniques, the elevator is closed to internally lock the wire, and the device is further withdrawn without the need for external manual control.

Guidewire control: physician and assistant

Systems using either the internal or external lock design permit physician control of the guidewire at or near the biopsy port. The ''short-track'' systems permit a separation of the wire from the catheter at the physician's finger tips for guidewire manipulation. However, only the ''tear-away'' design permits the assistant to control the wire during initial introduction of the cannula or sphincterotome. Once the wire is stripped from the tear-away channel for locking, only the endoscopist has control of the wire. The internal lock system permits shared control of the guidewire throughout the procedure. The assistant controls the wire in a conventional method or a wrap-around C-shaped lock fixes the assistant's end of the device to the duodenoscope for physician control.

Once locked in place by the endoscopist, a shorter wire (185 or 270 cm) permits the assistant to release the wire and prepare other devices for therapeutic ERCP. Depending on the device company, the assistant's end of the wire either remains suspended in air or can be fixed into the locking device. In general, the 0.035-inch guidewire is the recommended size for all of the short-wire systems because it tends to lock in the respective systems better than smaller 0.025-, 0.020-, and 0.018-inch wires.[2] The authors' experience has been that alternating the use of an external lock during intraductal maneuvers and the use of an internal lock during the time of a short-track ''push-pull'' exchange largely maintains wire fixation for all aspects of ERCP without external manual control.

Proprietary systems

Currently, 3 short-wire ERCP systems are commercially available. All feature devices for cannulation, sphincterotomy, and biliary stenting, but, because of variable stages in development, not all systems have all diagnostic and therapeutic devices customary to the conventional long-wire systems. The internal or external locking of the wire along with the ''short-track'' or ''tear-away'' monorail devices each have their advantages and disadvantages (see Ease of Use section below). Long wires can be used with any of the systems.

RX Biliary System: The first short-wire ERCP system (RX System, Boston Scientific, Natick, Mass) was introduced in 1999 and features both short-track and tear-away lumen designs. The RX System is composed of the following 3 components. (1) The *RX Locking Device* is an external design lock of hard plastic that has notches for fixation of 1 or 2 wires. It snaps onto the endoscope handle and is secured below the biopsy port with a strap. It is packaged with a separate proprietary design biopsy port cap made of silicone rubber with a sponge antileak mechanism intended to reduce air and bile leakage. The lock and cap are also available separately (Fig. 1). (2) *RX Compatible Biliary Devices* are made with open ''tear-away'' channel monorail designs for those devices used for gaining initial access (sphincterotomes, catheters) and in short-track designs (5 to 50 cm) in those used after initial access (cytology catheters, dilating balloons, plastic and metal stents). No pancreatic stents are currently available. (3) The *Jagwire* is a 260-cm guidewire that has a coated firm shaft and more flexible hydrophilic leading tip with 2-color spiral markings for recognition of wire movement. It is available in 0.025- and 0.035-inch diameters, with compatible sphincterotomes for each wire. An extendable version can be converted to a long wire with attachment of a 200-cm ''tail'' for therapeutic maneuvers that require long-wire devices.

Fusion System: The Fusion System (Cook Endoscopy; Winston Salem, NC), introduced in 2004, is a monorail system that features both short-track and tear-away lumen technology. Its components include (1) the *Fusion lock,* an external wire lock incorporated into a proprietary cap that fits on the biopsy port and can fix 1 or 2 wires. The lock has an opening for restraining the free external tip of the guidewires (Fig. 2) and (2) the *Fusion-compatible biliary devices* of 2 designs (the OMNI sphincterotome and cannula, which incorporate both a leading 6-cm short-track closed lumen and a closed tear-away channel [OMNI Breakthrough Channel] running the

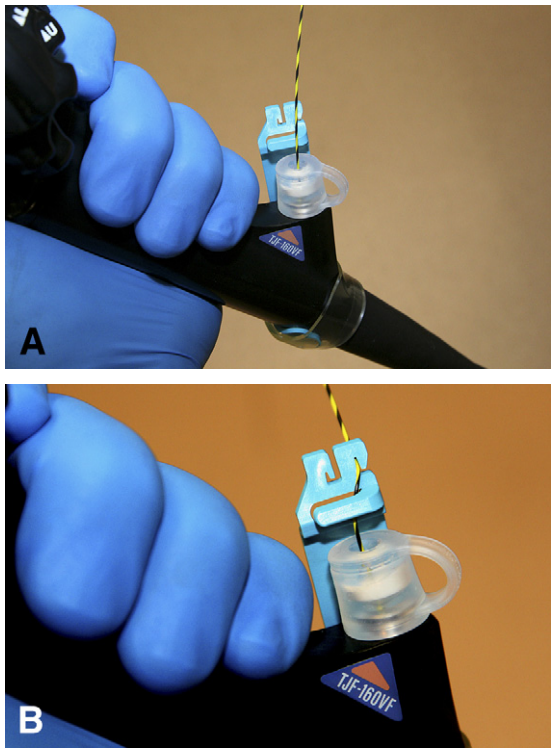

Figure 1. RX external locking device. The two parts (biopsy cap and wire lock) attach to the biopsy port and endoscope handpiece, where they provide resistance to leakage and wire locking for 1 or 2 wires. **A,** Wire in free unlocked position. **B,** Wire in locked position, as used during device exchanges and intraductal manipulation of devices.

length of the catheter that permits ''stripping'' of the wire for locking at the biopsy port, and Intraductal Exchange (IDE) devices [cannula, sphincterotome, extraction and dilating balloons], which require loading of the guidewire into the short track through a side port 6 cm from its leading edge). For initial device introduction, the wire is locked at the leading end of the catheter by advancement of an inner nylon locking stylet that is later retracted to permit wire manipulation. Once deep cannulation is achieved, device exchange can be done under fluoroscopy from within the duct by use of radiopaque marks on the tip of the wire and the IDE port. The wire is withdrawn 6 cm to disengage its tip from the device and then advanced alongside the device to maintain intraductal access. The device can then be removed without the need for a push-pull exchange. Alternatively, the device can be withdrawn over the wire with a short exchange externally. Short-track Fusion push catheters for 5F and 7F stents are available and the *Fusion Guidewire* is 0.035 inches in diameter and 185 cm long, with a firm shaft, more flexible distal hydrophilic tip, and 3-color spiral markings for recognition of wire movement. The wire is not extendable. Smaller wires (0.018 and 0.020 inches), however, can be introduced after the guidewire lumen of the Omni-tome has been ''torn away'' with a larger wire because of the closed channel design.

V System: The V System (Olympus, Tokyo, Japan), introduced in 2005, uses an internal lock design and catheters that do not use a short track. Its components include the *TJF-160VF (''V-scope''),* a duodenoscope with a V-shaped groove on the elevator that acts as the internal wire lock (Fig. 3). An 8-degree increase in the maximum allowable elevator angle is designed to provide increased friction on the guidewire. Effective locking depends on frictional resistance between the guidewire and the V groove, which prevents wire movement as devices are retracted from or advanced through the duodenoscope. *V-System devices* are analogous to conventional long-wire devices at the leading end but differ in design at the external end. A key feature of the system is the Y-shaped configuration separating the external guidewire lumen and port from the lumens used for balloon inflation and contrast injection. The independent guidewire port can be looped and attached to the duodenoscope with a C-shaped clamp to enable physician control. The 2 components can be realigned to return wire manipulation to the assistant. Any traditional ERCP device from any manufacturer may be used with this system. The *LinearGuideV* is a 0.035-inch diameter, 270-cm long wire with a hydrophilic coating over the leading 50 cm. Visual distance marks are also located from 5 to 12 cm and then transition to spiral markers at 13 cm from the tip, where locking of the wire at the duodenoscope's elevator is recommended. Smaller wires may be locked, but not as easily as the 0.035-inch diameter wire.

INDICATIONS AND EFFICACY

Although the alterations in devices and locking mechanisms permit physician control of the guidewire, there are no specific indications for use of the short-wire systems over conventional long-wire systems for ERCP.

There are limited data on the ease of use and efficacy of short-wire systems. A nonrandomized, multicenter comparison of short-wire systems (Rx System) (n = 120) and traditional long-wire systems (n = 172) reported similar cannulation rates of 95%; however, 11 cases in the short-wire group were excluded from analysis because standard long devices were required for successful cannulation. For biliary indications, the short-wire system yielded a decrease in total procedure time for therapy (from 34 to 27 minutes, $P = .002$), procedure time after cannulation (from 23 to 18 minutes, $P = .006$), and a trend toward less fluoroscopy time.[5] A prospective single-center randomized study (n = 46) compared short-wire (Fusion) with long-wire systems and demonstrated a decrease in procedure time for biliary stent insertion with the short-wire system ($P = .001$) and a trend toward a shorter procedure time.[6]

A small series using the internal wire locking V-Scope reported no loss of intraductal access during device exchange in 17 procedures.[7] In a randomized comparison

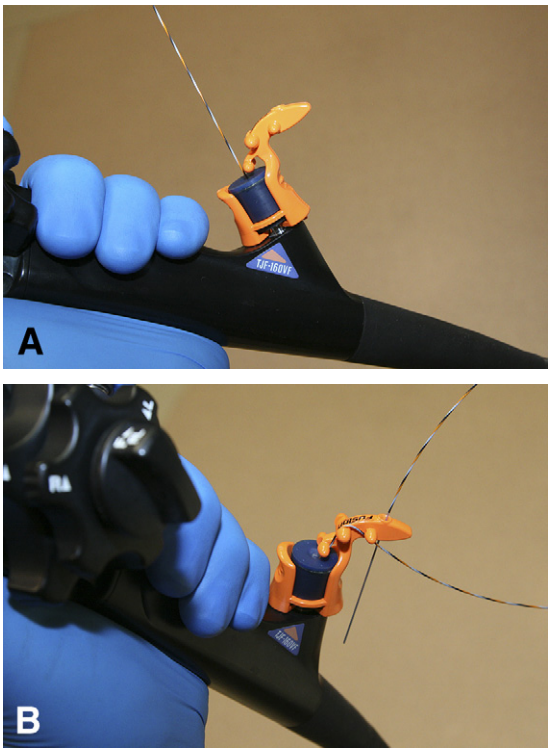

Figure 2. Fusion external locking device. The single piece device attaches to the biopsy port, where it serves as both a port cover against leakage and a wire lock for 1 or 2 wires. **A,** Wire in free unlocked position. **B,** Wire in locked position, as used during device exchanges and intraductal manipulation of devices.

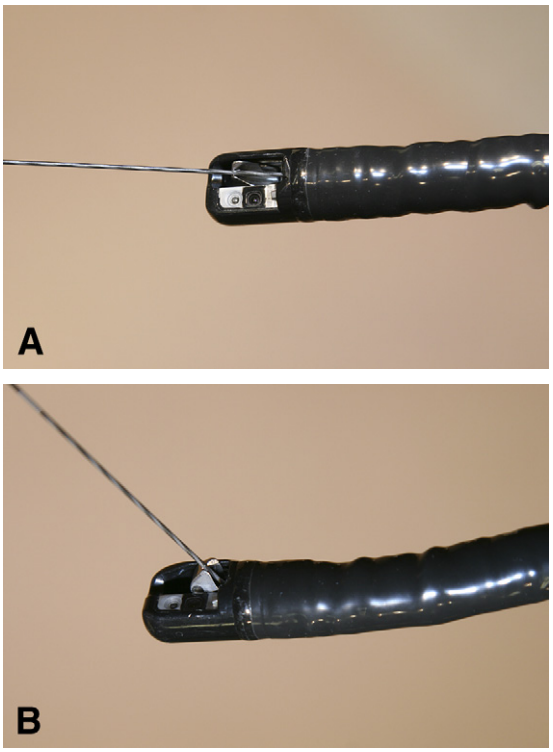

Figure 3. V-Scope internal locking device. The V-Groove and enhanced elevator excursion provide frictional locking of the guidewire within the duodenal lumen. **A,** Relaxed elevator, as for passage of a device into the duct. **B,** Raised elevator, as for wire locking during device exchanges.

of the V-System (n = 28) versus a standard duodenoscope with traditional accessories (n = 22), median procedure times were reduced (19.4 vs 31.7 minutes, $P < .001$), guidewire repositioning was required less often ($P = .0005$), and locking of the guidewire was successful in 63 of 71 exchanges (89%) with the V-System.[8] Although published data are otherwise lacking, the main advantages to short-wire systems accrue from the ability for the physician to control the guidewire during cannulation and stricture access, particularly in settings with inexperienced assistants.

Several studies describe use of wire-guided biliary cannulation alone or in comparison with conventional cannulation techniques using contrast injection.[3,4,9] One prospective, single-operator, randomized study (n = 400) assessed physician control of the guidewire during cannulation. Among low-risk patients, cannulation with a physician-controlled guidewire and sphincterotome was equally successful to cannulation with a sphincterotome alone (99% vs 98%) but yielded lower rates of post-ERCP pancreatitis (0% vs 4%, $P < .01$).[4]

EASE OF USE AND LIMITATIONS

Transition from conventional long-wire systems to short-wire systems requires minimal exposure for both physicians and assistants.

Wire locks and caps

Both the available external wire locks are easy to use, accept all wires, and have the capability of locking 2 guidewires simultaneously. Use of the external locks during device manipulation and exchange necessitates the use of one of the short-track catheters. The RX lock requires care in initial positioning above the biopsy port. The RX biopsy port cap should be pierced before use to prevent damage to the tip of devices during insertion or inadvertent dislodgement of the antileak sponge into the endoscope channel. Its efficacy in preventing bile and air leakage is reduced when the paths of the exiting wire and catheters are not parallel at the level of the biopsy port. Passage of accessories through this cap can be facilitated by use of a lubricant. The Fusion lock allows use of either of 2 wires independently, without the need to unlock the second wire. Both locking systems require care during device withdrawal to ensure wire separation from the catheter, thus avoiding the tendency of the wire to snag in the catheter, looping between biopsy port and wire lock, resulting in loss of access. This can be remedied by withdrawal of the device parallel to the external portion of the wire or by placing a supporting finger on the wire and locking device during device withdrawal.

The V-Scope locking elevator can be used with all wires and device systems. External wire control by the assistant is

required during introduction of devices across the elevator into the duct and during intraductal manipulation, such as repeated balloon sweeps. Retention of slippery wires and regular wires in some positions can be problematic. Locking is enhanced when the duodenoscope is in a ''short'' position slightly proximal to the papilla. With endoscope wear, locking might become less reliable. Because the lock is part of the endoscope, this system can only be introduced after a purchase of the proprietary endoscope.

Devices

Guidewire manipulation at the endoscopist's fingertips above the suction cap is straightforward. Extraction balloon manipulation is made easier with a continually locked wire. Most device exchanges over a guidewire are limited to between 5 to 20 cm. Similarly, the tear-away channel devices are easy to use and the wire strips easily from the assistant's end to the suction port for locking. Flushing of the Rx C-channel guidewire lumen with saline solution to lubricate hydrophilic guidewires, however, is not possible. Further, once a guidewire is torn from this channel, the introduction of smaller than 0.035-inch guidewires and angled guidewires may be difficult. The open-channel design may weaken the catheter wall, reducing the pushability of some devices. The Rx cytology brushes lack optimal pushability as well, on the basis of the materials used in manufacturing. With a closed-channel breakthrough design (OMNI), flushing of the guidewire lumen is possible and smaller guidewires (eg, 0.018 inch) can be introduced, even after ''tearing'' of the guidewire from its lumen. Pushability of the device with this design is theoretically enhanced given its closed lumen and a stiffening wire that runs the course of the device. Because of the closed-channel design, initiating ''tearing'' of the wire by the assistant from the lumen toward the biopsy port requires use of an accompanying device to break the wire from the lumen.

If guidewire exchange is to be done in a short-track system without a parallel open or tear-away channel, the device must be removed from the endoscope, loaded with the desired short wire, and reintroduced for repeat cannulation. However, in the IDEtome or cannula, exchange to a long wire can be accomplished through the separate channel used by the wire-locking stylet. An advantage to the IDE systems is the ability to maintain guidewire access above a stricture to facilitate multiple stenting and to reposition or remove inappropriately positioned plastic stents without the usual sequence of full deployment, stent removal, reaccess, and replacement. However, the wire within the short-track system is in the leading tip of the device for only 6 cm, resulting in the wire running parallel to the device in the duodenal lumen; hence, the pushability of both the device and wire is decreased with this parallel alignment and can result in wire ''looping'' in the duodenum if the endoscope is not maintained close to the papilla.

V-system catheters, like long-wire systems, allow flushing of the wire ports to facilitate use of hydrophilic wires. The full-length wire channel may theoretically enhance pushability. The separation of the wire and injection ports allows control of these 2 tasks to be traded between physician and assistant throughout the procedure. The physician control of the wire, however, is not at the fingertips above the suction port and is less ergonomically friendly than other designs.

SAFETY

There are no publications specifically addressing the safety of these systems. However, potential damage to ERCP accessories may occur with the locking devices. For example, external locking of the wire may fray the guidewire, compromising its integrity. If the antileak caps are not consistently retaining air and bile, splashing of secretions may occur. Once locked, the proximal end of the shortest wire freely suspends in the air and may pose a risk for eye injury to personnel or the patient if appropriate safety measures are not taken, such as use of eyewear or placing a towel over the patient's eyes, respectively.

When devices in the internal locking endoscopes are introduced, the V-shaped elevator may inappropriately be engaged, resulting in trauma to the device's tip or ''catching'' of the guidewire in the space between the V groove and the working channel. Lack of familiarity with the internal locking mechanism may result in improper locking of the wire and subsequent loss of access, necessitating repeated attempts at cannulation.

Search of the MAUDE database revealed numerous reports of device malfunction and several of patient injury during use of short-wire systems. Most are not specific to the proprietary system but represent balloon, wire, catheter breakage, or malfunctions seen with conventional ERCP devices. Multiple reports highlighted separation of an inner component of the Fusion wire guide lock/biopsy port cap and dislodgment into the accessory channel of the endoscope or the duodenum. Similar malfunction can occur with other multicomponent caps. Similarly, the database contains several reports of Trapezoid Basket (Boston Scientific, Natick, Mass) failure, entrapment, or malfunction resulting in surgery.

FINANCIAL CONSIDERATIONS

The short-wire systems are highly variable in price (Appendix 1). There is a nominal unreimbursed cost for the external locking devices and disposable biopsy caps. Coding for these devices is similar to that for conventional

ERCP accessories. For the internal locking devices, the major expense is in the purchase of the proprietary endoscope.

CONCLUSIONS

Short-wire ERCP is feasible because of the development of proprietary external and internal wire-locking mechanisms. For the external locking systems, refinement of catheter technology to short-track designs was required. All short-wire systems are simple to learn and offer the advantage of physician control of both the device and guidewire. Theoretic advantages include faster device exchanges, less use of fluoroscopy, and the ability to perform therapeutic ERCP with less experienced staff. Whether higher cannulation rates or lower complication rates will result from the use of short-wire systems requires investigation. As this technology evolves, all ERCP devices will likely be short-wire compatible.

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Prepared by:
ASGE TECHNOLOGY COMMITTEE
Raj J. Shah, MD
Lehel Somogyi, MD
Bret T. Petersen, MD, Chair
William M. Tierney, MD
Douglas G. Adler, MD
Bipan Chand, MD
Jason D. Conway, MD
Joseph M.B. Croffie, MD
James A. DiSario, MD
Daniel S. Mishkin, MD
Louis Michel Wong Kee Song, MD

This document is a product of the Technology Committee. This document was reviewed and approved by the Governing Board of the American Society for Gastrointestinal Endoscopy.

APPENDIX 1

	Product	Guidewire Diameter (inch)	Comment	Price ($)
Boston Scientific				
Locking Devices/Caps	RX Locking Device			7.90-8.90
	RX Locking Device And Biopsy Cap			14.90
Cannulas	DualFlex	0.025 or 0.035	Tapered or Ultra Tapered Tip	89
	Tandem RX	0.035	Two injection lumens	89
	RX Single Use	0.035	Standard, Tapered or Ball Tip	89
Guidewires	Hydra Jagwire	0.035	Length 260 or 450 cm, Straight or Angled Tip	199.50
	Extendable Jagwire	0.035	Length 260 cm, Straight or Angled Tip	149.50
	Jagtail Guidewire Extension	0.035	Length 200 cm	95
	Jagwire	0.025	Length 260 cm, Straight or Angled Tip	129.50
Sphinctertomes	Autotome RX	0.025 or 0.035	Cut Wire Length (mm)/Tip Length (mm)/Tip Diameter (FR) - 20 or 30/5/3.9, 4.4 or 4.9	279
	Ultratome RX	0.035	Cut Wire Length (mm)/Tip Length (mm)/Tip Diameter (FR) - 20 or 30/5/4.9	209
Guidewire Preloaded Sphinctertomes	Hydratome RX	0.035	Cut Wire Length (mm)/Tip Length (mm)/Tip Diameter (FR) - 20 or 30/5/4.4 or 4.9	490
	Jagtome RX	0.025 or 0.035	Cut Wire Length (mm)/Tip Length (mm)/Tip Diameter (FR) - 20 or 30/5/3.9, 4.4 or 4.9	419-439
Needle Knife	RX Triple Lumen	0.035	Cut Wire Length (mm)/Tip Length (mm)/Tip Diameter (FR) - 5/5/<5	219
Stone Removal Balloon	Extractor RX	0.035	Balloon Diameter (mm) 9-12/ 12-15/15-18	199
Stone Removal Basket	Trapezoid RX	0.035	Open Basket Diameter 1.5, 2.0, 2.5 or 3.0 cm	349
Biliary Dilation	Hurricane RX Balloon	0.035	Balloon Diameter 4, 6, 8, or 10 mm, Length 2 or 4 cm	299
	Breeze RX Biliary Inflation Device			99
Cytology Brush	Combo Cath RX	0.035		129
Metal Biliary Stents	Wallstent RX Covered Metal	0.035	Unconstrained Diameter 8 or 10 mm, Unconstrained Length 4, 6 or 8 cm	1650
	Wallstent RX Metal	0.035	Unconstrained Diameter 8 or 10 mm, Unconstrained Length 4, 6, 8 or 10 cm	1450
Preloaded Plastic Biliary Stent	RX Plastic	0.035	Diameter 7, 8.5, 10, 11.5 FR, Length 5, 7, 10, 12 or 15 cm	149
Cook Medical				
Locking Device	Fusion Locking Device			15
Cannulas	Fusion OMNI ERCP	0.035		90
	Fusion ERCP	0.035		82
Guidewire	Fusion Ultra Short Guidewire	0.035	185 cm long	140
Sphinctertomes	Fusion OMNI-TOME	0.035	Cutting Wire Length 25 mm	249
	Fusion IDE-TOME	0.035	Cutting Wire Length 25 mm	208
Guidewire Preloaded Sphinctertome	Fusion OMNI-TOME with Fusion Ultra Short Guidewire	0.035	Cutting Wire Length 25 mm	369
Needle Knife	Fusion Needle Knife	0.035	Cutting Wire Length 4 mm	208
Stone Removal Balloon	Fusion Extraction Balloon	0.035	Balloon Diameter 8.5-12-15 mm	165

APPENDIX 1 (*continued*)

	Product	Guidewire Diameter (inch)	Comment	Price ($)
Stone Removal Basket	Fusion Extraction Basket	0.035	Basket Diameter/Length 2 cm/4 cm	195
Biliary Dilation	Fusion Dilation Balloon	0.035	Balloon Diameters 4,6,8,10 mm	208
	Fusion Dilation Catheter	0.035	Tapered Tip Length 3 cm	99
Cytology Brush		0.035	Brush Length/Diameter - 2.5 cm/ 3 mm	109
Biliary Metal Stents	Fusion Zilver Stents	0.035	Stent Diameter/Length - 6,8,10 mm/4,6,8 cm	1250
Plastic Stents	All Cook biliary stents		All appropriately sized Cook stents can be used with Fusion introducer system	59
Stent Introducer	Fusion Oasis Stent Introducer	0.035	Stent Diameter 8.5 or 10 FR	99
Pushing Catheter	Fusion Pushing Catheter	0.035	Stent Diameter 5 or 7 FR	66
Olympus				
External Device Holder	V-System V-Holder			163
Cannulas	StarTipV Long Taper Tip	0.025		72
	StarTipV Standard Tip	0.035		72
	X-PressV Cross Cut Rounded Tip	0.035		72
	StarTip V Taper Tip	0.025 or 0.035		72
	StarTipV Short Taper Tip	0.025 or 0.035		72
	StarTip V Ball Tip	0.035		72
Guidewires	LinearGuideV	0.035	270 or 450 cm lengths, straight or angled tip	155-160
Sphinctertomes	CleverCut2V Double Lumen	0.035	Distal tip length/Cutting wire length - 7/20,25 or 30 mm or 15/20 or 30 mm	197
	CleverCut3V Triple Lumen	0.035	Distal tip length/Cutting wire length - 3/20 or 30 mm, 7/20,25 or 30 mm or 15/20 or 30 mm	207
	CleverCut3V Triple Lumen Tapered Tip	0.025	Distal tip length/Cutting wire length - 7/20 or 30 mm	207
Stone Removal Balloon	Multi-3V Triple Lumen	0.035	Balloon Diameter 8.5-11.5-15 mm	165
Stone Removal Baskets	TetraCatchV Rotatable		Opening Width 22 mm	165
	TetraCatchV Wireguided	0.035	Opening Width 22 mm	165
	FlowerBasketV Rotatable		Opening Width 20 mm	286
	FlowerBasketV Wireguided	0.035	Opening Width 20 mm	286
Biliary Stents	V-System Polyethylene Biliary Stents		Straight with proximal or center bend, 7, 8.5 or 10 FR diameter, 5,7,9,12 or 15 cm length	61
	V-System Polyethylene Biliary Stents		Double pigtail, 7 FR diameter, 3,4,7,10 or 15 cm length	61
	V-System Biliary Stents - Double Layer		Straight with proximal or center bend, 10 FR diameter, 3-15 cm length	206
Preloaded Plastic Biliary Stent Introducers	V-System Stent Introducer Sets	0.035	Conventional or Preassembled, Available for 7, 8.5 or 10 FR size stents	72