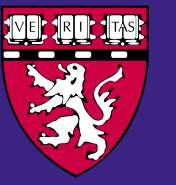




BUDGETING FOR BRONCHOSCOPE DAMAGE IN AN INTERVENTIONAL PULMONOLOGY PROGRAM



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INTRODUCTION

- Interventional Pulmonology (IP) is a new component of Pulmonary Medicine focused on procedural issues.
- An interventional program may employ a wide variety of diagnostic and therapeutic procedures inherently dangerous to the equipment.
- This potential damage may constitute a major unbudgeted financial loss when planning on establishing an IP program.
- We report our experience in damage to flexible bronchoscopes and their associated budgetary consequences, and propose an educational intervention to control those costs.
- This experience may also provide budgetary guidelines for anticipated repairs.

METHODS

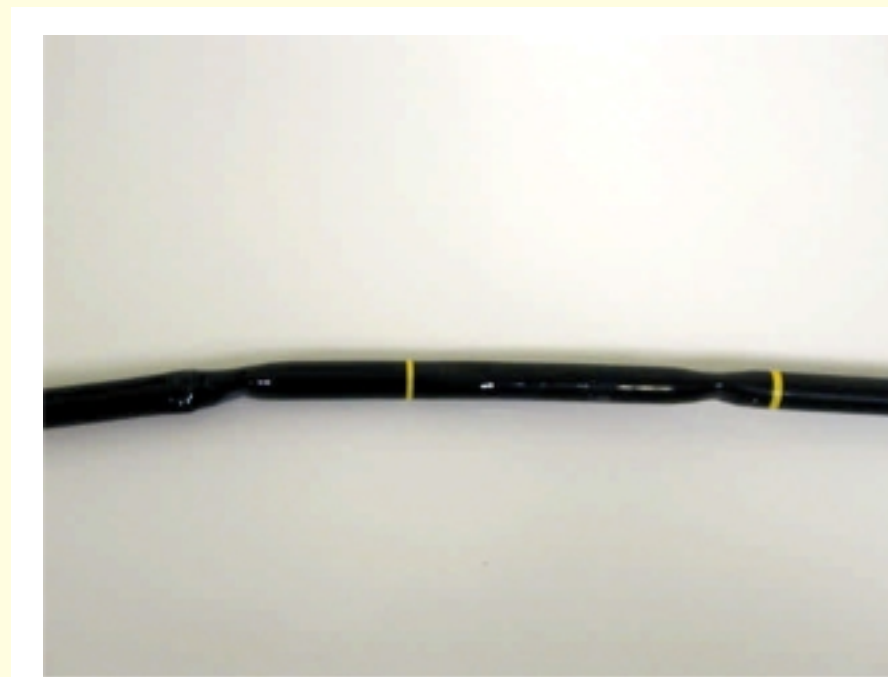
- A retrospective review of repair costs to flexible bronchoscopes over a period of time since the inception of an IP program was compared with the costs of repairs for a similar time period prior to interventional procedures being performed.
- Procedures were performed at a university based tertiary care referral center which utilizes diagnostic and therapeutic modalities via rigid and flexible bronchoscopy. These include: YAG laser, PDT, APC, AF, cryotherapy, stent placement, EBUS, TBNA as well as standard procedures performed in routine bronchoscopy suites.
- An educational intervention was introduced which included requirement of the operators (staff and fellows) to become proficient in rigid and flexible bronchoscopy and the associated accessories through sessions spent in the Interventional Training Center. This was accomplished with the use of intubating mannequins and virtual reality training (Immersion Medical, San Jose, MD). Only after demonstrating proficiency in performing advanced endoscopic procedures in this training environment, operators were permitted to perform live procedures.
- The technical staff responsible for assisting the operators (25 attendings and 30 fellows) attended sessions which stressed the importance of careful handling and testing of the equipment.
- All safety regulations for the prevention of damage to the bronchoscopes were reviewed (eg. Careful sheathing of TBNA needles).

YEAR	1996	1997	1998	1999	2000	2001	2002
Total Cost / Year	5279	6825	13296	14909	33865	57451	14475
Total Cost / Period	25400			106225			14475
Average Cost / Period	8467			35408			14475
Total # of Procedures / Year	685	525	550	605	720	1050	1280
Total # of Procedures / Period	1760			2375			1280
Cost / Procedure	14			45			11

YEAR	1996	1997	1998	1999	2000	2001	2002
Major Damage (>\$1000 with no visible damage)	2	2	3	2	4	6	2
Major Damage (>\$1000 with visible damage)	0	0	1	2	6	6	0
Minor Damage (<\$1000)	1	2	3	9	15	7	8
Total Damaged Scopes	3	4	7	13	25	19	10

YEAR	1996	1997	1998	1999	2000	2001	2002
Major Damage	insertion tube 2 replace.	insertion tube 2 replace.	forcep channel leak w/ no obvious trama 3	forcep channel leak w/ no obvious trama 2	forcep channel leak w/ no obvious trama 4	forcep channel leak w/ no obvious trama 5	light guide bundle / forcep channel leak w/ no obvious trama 2
			Forcep channel leak from trauma 1	Forcep channel leak from trauma 2	Forcep channel leak from trauma 3	crushed insertion tube 4	cracked control body 1
				light guide patch 3	light guide patch replace. 1	auto brightness control video lens replace. 1	light guide connector broken 1
Minor Damage	bending section / ang. adj. 1	bending section / ang. adj. 2	bending section / ang. adj. 3	bending section / ang. adj. 6	bending section / ang. adj. 12	bending section / ang. adj. 5	bending section / ang. adj. 6
				light guide patch 3	light guide patch replace. 1	switches repair dents 1	light guide patch switch head 1

Type of Damage	Repair Cost
Major Refurbishment	7200
Replacement of Insertion Tube	3300
Replacement of Light Guide Bundle	1100
Replacement of Forcep Channel	850
Angulation rebuild	1000-2000
Angulation Adjustment	150
Replace coil pipes	700
Disassemble scope and dry out system	500
Replacement of Bending Rubber	135
Light Guide Patch	120
Auto-Brightness Control	250
Replacement of Swithes	120
Replacement of video cover glass	300
Repair Dents	100
Clean and Polish Lens	100



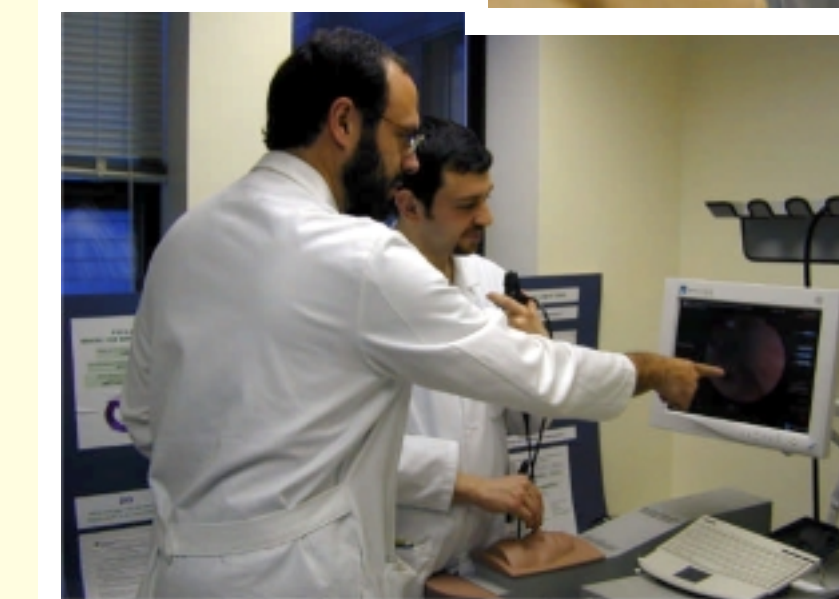
BITE DAMAGE



LASER DAMAGE



TBNA NEEDLE THROUGH CHANNEL



RESULTS

- During the first three years of our interventional program, the cost of repairing flexible bronchoscopes averaged \$35,000/year (US).
- This compares to an average of \$8,000/year (US) for a similar period just prior to the development of the IP program.
- Cost of repairs per procedure increased from an average of \$14 (US) to \$45 (US) during the initial three years of the program.
- After initiating a strategy of education for both operators and handlers of the equipment, the cost of repairs per procedure significantly decreased to an average of \$11 (US) for the year following implementation of the intervention.

CONCLUSIONS

- When implementing an active IP program, equipment repair costs can be significant and are not usually budgeted for.
- If not carefully monitored and acted upon, the cost of repairs for damaged instruments may negatively impact any contribution margin of an IP program.
- The introduction of a strict training schedule for fellows, staff and operators does not only teach techniques of procedures, but may also significantly decrease repair costs.