Focused Versus Operating Room–Wide Recovery of Unused Supplies for Overseas Reconstructive Surgery

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Proliferation of programs that recover surplus operating room supplies may effectively address the needs of volunteer overseas surgical efforts. However, these programs tend to garner supplies highly heterogeneous in nature. In order to evaluate the nature and quantity of supplies generated by plastic and reconstructive procedures, we extrapolated the inventory of 71 consecutive cases from our 33,000-case database. Additionally, we examined the recovery of 7 specific supplies from all cases performed at Yale–New Haven Hospital over a 3-year period. Though consistency is unlikely when only plastic and reconstructive surgical cases are examined, operating room–wide recovery may be a reliable source of usable materials. (*Plast. Reconstr. Surg.* 97: 630, 1996.)

The good will and intentions of health care workers throughout the developed world are manifest by the donations of medical services and supplies to our less well-off colleagues and their patients in impoverished nations.[1,2] The extensive volunteer efforts of plastic and reconstructive surgeons are demonstrated by the many agencies (e.g., Interplast, AGBU-Yerven Project, Operation Smile, Heal the Children, and About Face) that specifically target populations requiring plastic and reconstructive procedures. Unfortunately, the acquisition of surgical supplies for such efforts has been hampered by the current U.S. economy, increasing financial concerns of industry, and the cost-saving measures associated with health care reform. This has led to increasing reliance on alternative sources of material donations, e.g., materials that have been secured by health care workers from their own medical facilities. These efforts often rely on the recovery of surplus materials and, as such, are subject to continually changing conditions of hospital purchasing and inventory as well as clinical policies and procedures. These factors result in day-to-day heterogeneity in the nature and quantity of donated supplies.

In a recent report, Pennino et al.[3] described their efforts in garnering materials from a group of hospitals in the Rochester, N.Y., area. While emphasizing the benefits of such a program, they also referred to potential problems: Collection is usually erratic; supplies are donated in bulk without preparation of a database or inventory; and no system exists to match the needs abroad with available donations.[2] REMEDY, a not-for-profit physician group that originated at Yale–New Haven Hospital, has identified similar limitations[1,3,4] and thus has structured its collection protocols to address these (and related) issues. To date, this program has generated more than $500,000 of material from the operating rooms at Yale–New Haven Hospital and has been introduced at 75 other centers. We wished to assess the limitations and benefits of institutionalized recovery for such surgical efforts as noted above. The present report delineates those items recovered solely from plastic surgical procedures at Yale–New Haven Hospital and the ability of operating room–wide recovery to supply specific items that we deemed to be essential to the overseas efforts of reconstructive surgeons [based on recent work with Interplast by one of the authors (Rosenblatt)].

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METHODS

The REMEDY protocol for recovery of operating room supplies has been routine practice at Yale–New Haven Hospital since June of 1991. Details of the protocol have been described elsewhere.[1] Briefly, at the end of all surgical procedures, uncontaminated and undamaged items are collected by the nursing staff in a paper bag provided new for each case by the Yale–New Haven Hospital central sterile supply personnel. Though not fitting the criteria for regulated waste, the materials are returned to our decontamination facility with the contaminated surgical instruments. There they undergo decontamination with ethylene oxide, appended to routine sterilization loads only when surplus space permits. (This decontamination is performed to minimize the risk to volunteer sorters and shippers; its need is speculative, and it is not practiced by many REMEDY-associated programs.) After decontamination, all materials are sorted by trained volunteers, who record the recovered items into a computer database. Recovery and inventory occur daily; case-by-case detailed assessment is applied yearly to a 3-month sample and recently has been facilitated by a bar-code system applied to both item stock and procedure numbers.[4]

For the present report, data were extrapolated to evaluate two issues of importance to those wishing to garner supplies for overseas volunteer reconstructive surgery: (1) case-by-case inventory of supplies recovered from consecutive plastic and reconstructive surgeries (in order to determine the ability of an individual surgeon to collect supplies for his or her own charitable efforts) and (2) cumulative inventory of seven specific items (that could be helpful for overseas surgery) from all operating room cases in our 33,000-case database.

RESULTS

The detailed assessment of material recovered from the 71 consecutive cases (Table I) demonstrates the wide intercase variability, which often hampers short-term, limited-scope recovery efforts. Even cases of similar type, often performed by the same surgeon, had wide intercase variability. For example, the value of recovered supplies from skin-flap procedures averaged $8.87 (range $0 to $27.24). Likewise, the recovery from wound debridement was $5.87 (range $0 to $37.60). Gloves and sutures were recovered most consistently. However, the heterogeneity of recovered suture material indicates, once again, that short-term recovery may be of limited value (Table II).

Despite the wide intercase variability, there was overall consistency in the operating room–wide collection over an extended period (Table III). Though concern regarding minimizing waste in the operating room, as well as other factors, may contribute to reduced recovery of given items (e.g., gloves), the quantity of recovered supplies remained adequate for relief efforts.

Variations in the dollar value of all recovered items (see Table III) may in fact reflect a 15 percent increase in the operating room case load from 1992–1993 (10,042 cases, generating $150,000) to 1993–1994 (11,555 cases, generating $195,000). Continuous operating room–wide recovery ensured significant supplies for overseas donation and has enabled projection of future collections.

DISCUSSION

The present study sought to address two important aspects of material recovery that may have a significant impact on overseas volunteer surgical efforts. The variable nature of material generated from plastic and reconstructive surgical cases at our institution indicates that a brief, focused effort would be insufficient to generate needed supplies. Alternatively, an operating room–wide recovery program can be quite effective.

There has been concern about both the potentially erratic nature of collections and inconsistent and unreliable sources of materials that may result from operating room recovery efforts.[2,3] Our experience with 33,000 cases has demonstrated that substantial amounts of useful materials are predictably recovered when a long-term, continuous program is in effect. Recovery from all operating room procedures can generate significant quantities of supplies (see Table III), which may be projected through use of a database such as that employed in the current investigation.

There is also concern that the donation of bulk, uninventoried materials that are not matched to actual needs may place a burden on the recipient.[2] Though the literature is replete with systems of evaluation of developing-world recipient sites, these are impracticable for small-scale, low-budget efforts.[5–8] REMEDY has maintained an inventory of donated supplies since June of 1991 and has recently

TABLE I

Recovery Inventory of 71 Consecutive Plastic and Reconstructive Surgery Cases

Procedure	Total Dollar Value	Gloves*	All Sponges (Packages)*	Dressings*	Gowns and Drapes*	Syringes	Specimen Containers	Skin Staplers	Suction Hoses
Split-thickness graft to leg ulcer	$ 1.40	1							
Excision of lipoma	$ 2.85		1			2	2		1
Femoral wound debridient and flap	$ 9.30	2							
Axillary node dissection	$ 9.46								
Irrigation and closure leg wound	$ 0.00								
Incision and drainage pacemaker wound	$ 0.00								
Leg wound debridement	$ 0.00								
Revision breast wound	$ 0.00								
Exploration arm graft	$ 0.00								
Excision neck cyst	$ 0.00								
Split-thickness graft to arm	$ 0.00								
Debridement and skin graft to burn	$ 4.79			1					
Pectoralis flap	$ 0.00								
Delayed primary closure leg wound	$ 0.00								
Flap to pressure sore	$ 6.08	6							
Flap to ischial ulcer	$18.57	8	7						
Evacuation back wound hematoma	$ 1.86	2	1				2		
Incision and drainage of lumbar wound	$ 0.00								
Debridement pressure wound	$37.60	2	6		1				
Debridement and toe amputation	$26.98		1						
Debridement of burn wound	$ 0.00								
Flap to sternal wound	$ 9.73	2	1			1			
Excision skin graft	$15.62	1							
Debridement and closure	$ 0.00								
Secondary debridement of abscess	$ 0.00								
Free flap to leg	$ 0.00								
Graft to open wound	$ 0.00								
Debridement of skin graft	$35.88	1	5				1		
Debridement of pelvic wound	$ 1.75	5							
Debridement of burn wound	$ 0.00								
Incision and drainage of arm graft	$ 0.00								
Closure of elbow wound	$18.30	8	26					2	
Closure of spinal wound	$ 3.27								1
Debridement of infected sternum	$ 1.40	1							
Debridement of heel ulcer	$ 0.00								
Breast lumpectomy	$12.47						1		
Neck mass excision	$ 0.00								
Split-thickness skin graft	$ 6.66			2	1				
Debridement and closure leg wound	$ 0.00								
Drainage of perirectal abscess	$ 9.37	3	1						1
Vulvectomy	$ 6.24								
TRAM flap	$27.24	9	11						
Excision malignant melanoma	$32.54	2			1				
Repair of ischial pressure sore	$ 3.62	1			1				
Debridement of spinal wound	$ 0.00								
Tissue removal	$ 0.00								
Axillary node dissection	$38.70								
Mucosal anoplasty	$17.78	3							
Debridement of pressure wound	$36.31		11	1	1				
Lipoma excision	$ 0.00								
Lymphocele repair	$ 5.90					1			
Biopsy of neck lesion	$ 0.00								
Debridement of foot wound	$ 3.37								
Closure of hip wound	$ 6.82	1		2		2			
Debridement of foot wound	$15.07	5	9	2				1	
Hydradenitis excision	$28.13	3							
Lumpectomy and node dissection	$ 0.35	1							
Free flap to foot	$ 0.00								
Femoral lymphadenectomy	$ 0.00								
Axillary node dissection	$ 9.36	2	1						
Debridement and skin graft	$ 0.00								
Myelomeningocele repair	$33.78	3	1					1	
Skin graft	$ 0.35	1							
Debridement of leg wound	$15.50	2	21		1				
Anal fissurectomy	$ 0.00								
Incision and drainage of thigh abscess	$ 0.00								
Debridement of wound	$ 6.11				1				
Burn excision and graft	$ 0.00								
Groin lymphadenectomy	$ 0.00								
Skin graft	$ 0.00								
Melanoma excision	$ 0.00								
Cumulative recovery:		87	109	8	7	6	6	4	3

* Similar items combined.

† Items which were recovered in only one case.

Cautery Pencils	Scalpel Blades	Irrigation Syringes	Tube and Cord Holders (Velcro)	Pop-n'-Counts	Cautery Pads	Foley's ETC	Yankaurs	One Occurrence†	Total Sutures
	1								1
									4
1			1						
						1			
						1			11
								1	2
	1					2			
					1				
							2		
								1	1
				1					
					1				2
	1						1	2	2
									4
				1					7
									3
		1							3
									1
		1							
				1					
	1						1		12
	1						1		
								1	4
							1		
1	5	2	1	3	2	4	6	5	57

TABLE II
Summary of Sutures Recovered from 71 Consecutive Plastic and Reconstructive Cases

Quantity of Each Suture Type Recovered*		
One	Two to Three	Four to Five
1915	801	3802
3803	A185	G123
684	G322	662
G-014D	G323	J417
G-0270	J423	
G-013D	J493	
J339	K570	
J588	8606	
J649	G122	
J910	J304	
L112	J415	
L113	J416	

* Cases condensed for reporting; recovered sutures including those remaining sealed in their foil package.

instituted a simple, low-cost, and effective atlas and bar-code system (available at cost from the authors) that can be used by minimally trained volunteers.

The 33,000-case REMEDY database proved useful beyond the initial charitable program. Early in this effort we reported the waste-reduction effect of the program and have since developed it into a useful cost-effectiveness tool. Through identification of excessive preparation in the operating room, Yale–New Haven Hospital has developed a strategy of more cost-effective procedure design.[2,4]

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TABLE III
Three-Year Recovery of Selected Supplies

Year of Recovery	All Gloves	All Sponges	Gowns/Drapes	Suction Hoses	Cautery	Sutures	Syringes	All Recovered Items
June 91–May 92	$3314	$3147	$15,512	$752	$3944	$126,335	$915	$183,000
June 92–May 93	$2797	$2888	$15,665	$881	$3597	$ 91,300	$734	$150,000
June 93–May 94	$1848	$2408	$11,398	$945	$2203	$105,325	$997	$195,000

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