

# Comparison of Resident Operative Case Logs During a Surgical Oncology Rotation in the United States and an International Rotation in India

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Received: 29 December 2014 / Accepted: 24 February 2015 / Published online: 18 March 2015  
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**Abstract** This study compared the operative case log experience between rotations during General Surgery residency in the United States and an international rotation in India. A resident from the General Surgery residency program at University of Nebraska Medical Center participated in an international rotation in Surgical Oncology at Mehdi Nawaz Jung Institute of Oncology in Hyderabad, India for 3 months in 2009. The operative case log of this resident (INT) was compared to those of another resident (US) on a rotation in surgical oncology at the parent institution during the same time period. Both institutions were tertiary care centers. We noted that the INT resident performed a greater

number of cases (132) when compared to the US resident (61). The INT resident also performed cases in a wider variety of disease categories such as: head and neck (26 %), gynecology (19 %), breast (14 %) and urology (4 %). In contrast, abdominal cases accounted for 68 % of the cases performed by the US resident with fewer cases in the other categories. The INT resident performed 98 % of the cases by the open approach, whereas the US resident performed only 81 % of cases by the open approach, with the remaining 19 % of cases performed by the laparoscopic approach. The results demonstrate that the INT resident performed a greater number of operative cases when compared to a resident (US) at the parent institution, and performed cases in more diverse disease categories with an emphasis on the open operative approach.

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**Keywords** Case logs · General surgery residency ·  
International rotations

## Introduction

International health in the past has mainly been thought of from a primary care perspective. Recently however, there has been increased interest from surgeons and surgical residents to address global health issues. Several studies (1–4) have documented the rising interest amongst surgical residents to undertake international rotations in the developing world. In a national survey of 724 surgical residents, Powell and colleagues found that 92 % of surgical residents were interested in an international rotation and 82 % would prioritize the experience over all or some other electives [1]. Similarly,

Jayaraman et al. conducted a national survey of Program Directors in General Surgery and noted that the majority would be interested in incorporating global health into their training [2].

Several barriers have been identified to the establishment of an international rotation during General Surgery residency [3]. Some of the potential barriers include lack of funding, administrative logistics, identifying suitable partner organizations and resident supervision. Nonetheless due to the rising interest, the Residency Review Committee (RRC) for Surgery released guidelines that permit general surgery residents to undertake international rotations [4].

The operative experience accumulated during an international rotation is variable and dependent on several factors. It is likely that with the approval by the RRC, we may notice an increase in the number of international rotations in General Surgery residency programs. There is a paucity of data to provide comparison of operative experience between an international rotation and rotations undertaken during General Surgery residency in the United States of America (USA). The aim of this study was to compare the operative experience between an international rotation conducted in the developing world and rotations during General Surgery residency in the USA.

## Materials and Methods

The University of Nebraska Medical Center began incorporating international rotations into the General Surgery residency program in 2009. The International Clinical/Research program permits a surgical resident to undertake clinical rotations in the developing world in addition to conducting research into disparities in global health care delivery. These rotations are a part of the global collaborative between the University of Nebraska Medical Center and various institutions in India, China and other countries across the world. A PGY 4 resident (INT) spent 3 months (October 1st through December 31st 2009) on an international Surgical Oncology rotation at MehdiNawaz Jung Institute of Oncology (MNJIO) in Hyderabad, Andhra Pradesh, India. MNJIO is a 250 bed teaching hospital with fellowships in Medical, Radiation, and Surgical Oncology.

The rotations were established after extensive discussions with the faculty at the parent and visiting institution. International rotations at the visiting institution were identified based on their ability to provide an all-around educational experience and the presence of committed faculty. The INT resident was able to attend clinic biweekly, participate in operative cases, ward rounds, local/regional/national conferences and other educational activities. Faculty supervised the INT resident at the parent and the visiting institution. A board certified surgeon from the parent institution was present at the

visiting institution on several occasions during the setup of the international rotation and performed weekly supervision of the resident by phone. The weekly supervision consisted of going over the weekly schedule, operative cases, assessment of clinical and educational experiences, and progress of research activities. Faculty also conducted local supervision daily at the visiting institution, who were in touch with the faculty at the parent institution on a regular basis. All activities performed by the INT resident were under the direct supervision of local faculty. Further, the research activities undertaken were done in collaboration with the College of Public Health at the University of Nebraska Medical Center.

After receiving IRB approval (IRB#: 497-10-EX) the case logs of the INT resident were collected and compared to the case logs of a PGY 5 resident (US) on a Surgical Oncology rotation at the University of Nebraska Medical Center in Omaha, Nebraska over the same time period. The Surgical Oncology rotation at the University of Nebraska Medical center and MNJIO provides care for patients with all types of cancer diagnoses. The case logs were reviewed for the total number of cases, the type of operation performed, and the type of approach (open or laparoscopic). Further analysis of operative cases was conducted based on the various categories such as Abdominal, Head and Neck, Breast, Gynecology, Skin and Soft Tissue, Urologic, Thoracic, Vascular, and Endoscopic. The other data collected included antibiotic use rate, infection, drain use, length of stay, staging, and any morbidities or mortalities.

Descriptive statistics were used to summarize the distribution of variables according to US or the international rotation in India. Chi-square tests, or Fisher's exact test for sparse distributions, were used to compare categorical distributions between the locations, and independent sample t-tests were used to compare mean values of continuous measures between locations. *P*-values less than <0.05 were considered statistically significant.

## Results

Over the time period of the study, the INT resident performed a greater number of major cases (132) compared to the US resident (61) (Table 1). The INT resident operated on patients that were much younger (mean 44.6 vs 60.7,  $p < 0.001$ ) and had a female preponderance of 61 versus 46 % in the US ( $p = 0.043$ ). Another significant difference included a higher rate of utilization of drains at the international site in India (87 vs. 52 %,  $p < 0.001$ ). The US had a slightly higher morbidity and mortality rate (22 vs 16.7 %) although this was not statistically significant ( $p = 0.35$ ). There was no significant difference between the length of stay between the two sites ( $t_{188} = 0.86$ ,  $p = 0.39$ ).

**Table 1** Differences in demographics, treatment, and outcomes for surgical oncology patients at the US site versus the international site in India

	US site (n)	International site (n)
n	63	132
Age (mean/median)	61.1/63.0	44.6/45.0
Male/Female	35/28	51/81
Prophylactic antibiotic use	62	132
Wound infection	2	4
Morbidity	14	18
Mortality	2	0
Length of stay in days (mean/median)	10.3/6	11.7/9
Drain use (# of cases)	29	124

We noted that the INT resident performed a wider variety of operations (Table 2). The INT resident performed significantly more cases ( $p < 0.001$ ) in the following categories: Head and Neck (26 %) Gynecology (19 %), Breast (14 %), Skin and Soft tissue (10 %), and Urology (4.5 %). In contrast, the cases for the US resident were predominantly Abdominal (68 %), with fewer cases being performed in the other categories.

A comparison of the type of operative approach also revealed significant differences ( $p < 0.001$ ) between the INT rotation and the rotation in the US. The US resident performed 83 % of the cases by the open approach and 17 % by the laparoscopic approach. In comparison, the INT resident performed 98 % of the operations by the open approach with minimal inclusion of the laparoscopic approach.

## Discussion

The results of our study demonstrate that the INT resident performed a greater number of cases during the same time period when compared to the US resident. The likely reasons

**Table 2** Categorical and procedural differences in surgical oncology cases at a US site versus and an international site in India

Type of case	US site (n)		International site (n)	
	Open	Laparoscopic	Open	Laparoscopic
Abdominal	34	9	32	2
Head and neck	6	0	34	0
Gynecology	0	0	25	0
Breast	5	0	18	0
Skin and soft tissue	3	0	13	0
Urology	0	0	6	0
Thoracic	0	1	0	1
Vascular	3	0	1	0
Total	51	10	129	3

for this include a larger patient population and variations in the functioning of the operating rooms. In the international rotation in India, three operating rooms were running concurrently and when one case was complete, the resident could frequently go into the next room and participate in the next case with very little turn-over time. The increased operative exposure should be considered in light of current Surgical Residency matriculation requirements. In order to sit for their qualifying examination, the American Board of Surgery states that Chief residents need to complete 750 operative cases prior to graduation [5]. Although controversial, some studies have demonstrated a diminished operative experience following implementation of the duty hour restrictions [6, 7]. In contrast to the US resident, the INT resident performed 18 % of the required 750 cases during a 3 month period. The approval by the RRC allows operative cases performed during international rotations to be counted towards the total needed for graduation. The higher volume of cases performed during an international rotation under appropriate supervision can help augment the total number of cases performed by General Surgery residents.

We also noted that the INT resident performed operative cases in a wider variety of categories than the US resident. These findings are consistent with Belyansky et al. who noted that on mission trips to Haiti, residents encountered a case distribution covering a wide range of defined categories [8]. The practice pattern of a rural surgeon in the US includes performing operations in categories other than General Surgery such as Gynecology and Urology, among others. The majority of the General Surgery residency programs in the US do not provide the spectrum of operative experience to suit the rural practice. Burkholder and colleagues noted that some residency programs are less likely than others to emphasize the training of rural surgeons as their mission [9] and given the current shortage of general surgeons in rural areas of the USA [10], it is likely that an appropriately selected international rotation can provide the additional required experience for those planning a career in rural surgery.

The INT rotation in India provided the resident with a predominantly open operative experience. Several studies have shown a concerning decline in the open operative experience for graduating chief residents in the USA [11–16]. Chung et al. noted that if the current trend continues the percentage of open operative cases would drop to less than 60 % of that noted in 1993 [9]. Similarly Bell et al. reported that the majority of residents did not perform enough open procedures to obtain technical proficiency [10]. An international rotation in the developing world where most of the cases are performed by the open approach can help supplement this experience.

One of the concerns arising from the duty hour regulations is the inability to teach residents about the continuity of care [17]. Morrissey et al. performed a survey of residents to identify barriers to providing continuity of care to 6 common and 4

uncommon surgeries [17]. They noted that the main barriers to providing continuity of care were the inability to attend clinic, ward/floor duties, and the duty hour restrictions. The INT resident was able to attend clinic more frequently than the US resident and the structure of the INT rotation in India enabled the INT resident to follow the entire course of treatment from pre-operative clinic to the operating room and to the post-operative clinic.

There are several limitations to this study. This is a comparative study between rotations undertaken at one General Surgery residency program in the USA and one international site in India. Similar to the differences in residency programs in the USA, it is well known that international rotations have significant variability depending on geo-political factors and socio-economic standing in the world. The variability is also dependent on the individual institution and involved international faculty. It is therefore likely that this experience may not be generalized to all international rotations nor will the experiences always be transferable between partnering institutions. It should also be borne in mind that the pathology, diagnostic work-up, treatment approaches, operative techniques and outcomes for the same disease condition vary between different parts of the world. The experience obtained during an international rotation may not always be applicable to the practice of the resident when they return to the USA. At the same time, this additional training may be potentially beneficial as residents will learn different methods for treating the same disease. Lastly, there are still many significant barriers to establishing an international rotation and not all programs in the USA may have the need or capability to establish one.

There are also several strengths to our study which demonstrated the potential benefits of international rotations. These strengths include a direct comparison of similar rotations (Surgical Oncology) over the same period and length of time. In addition the residents used for comparison were in the same level (senior years) of training. The data was collected prospectively, which improves the study's internal validity and all patients were included to decrease potential bias.

## Conclusions

The results of our study demonstrate the potential benefits of an international rotation as an adjunct to training during General Surgery residency. We noted that the resident undertaking an international rotation in India performed a higher number of operative cases in a wider variety of disease categories when compared to an USA resident during the same period of time. The Residency Review Committee for Surgery approved counting of operative cases undertaken during an

international rotation toward the required number needed for graduation. In light of this approval, the data from our study may be useful for General Surgery residency programs in the USA considering the inclusion of an international rotation option in their program.

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