

Impact of Medical Residency on Surgical Oncology Care at a Brazilian University Hospital

Impacto da Residência Médica Sobre a Assistência Cirúrgica Oncológica em um Hospital Universitário Brasileiro

Impacto de la Residencia Médica en la Atención Oncológica Quirúrgica en un Hospital Universitario en Brasil

Thales Paulo Batista¹, Tarcísio José Cysneiros da Costa Reis², Márcia Angélica de Lucena³, Rogério de Assunção Ehrhardt⁴, Rodrigo Guido de Araújo⁵, Paulo Henrique Domingues Miranda Brandão⁶

Abstract

Objective: The main aim of this study was to examine the influence of implementing a Medical Residency (MR) program in surgical oncology (SO) at the Oncology Center from Oswaldo Cruz University Hospital, University of Pernambuco (CEON/HUOC/UPE). **Methods:** A cross-sectional study was carried out and a retrospective cohort strategy was applied to compare the pre-vs. MR periods using Center-related variables as end-points. We also explored our academic production between the pre-vs. MR periods. **Results:** A 9% increase in the number of surgeries performed, as well as a 15% reduction in the number of hospitalizations was observed in the pre-vs. MR period. There was significant increase in the proportion of surgeries performed to treat malignant diseases in the MR period ($p < 0.001$), with no changes in the proportion of surgeries according to the complexity level of the procedures ($p = 0.999$) or among the SO areas (0.301). Our academic production also promisingly increased in the MR period. **Conclusions:** This study suggests that introduction of the MR program has positively influenced the SO care and academic production at our Center; however, further studies are needed to confirm a cause-effect relationship. Our approach also served to valorize the MR as an important training model for young surgeons and could be used as a tool to evaluate MR programs in different surgical specialties.

Key words: Internado y Residencia; Atención al Paciente; Educación Médica; Recife, PE

¹Surgical Oncologist from Instituto de Medicina Integral Professor Fernando Figueira (IMIP). Master's Degree, Health Sciences, University of Pernambuco (UPE), Brazil. Ex-Surgical Oncology Resident from CEON/HUOC/UPE.

²Residency Program Coordinator (Surgical Oncology) from Center of Oncology – Oswaldo Cruz University Hospital, UPE – CEON/HUOC/UPE. Doctor's Degree, Surgery, Federal University of Pernambuco (UFPE), Brazil.

³Surgical Oncologist (volunteer) from CEON/HUOC/UPE. Ex-Surgical Oncology Resident from CEON/HUOC/UPE.

⁴Surgical Oncologist from Hospital de Câncer de Pernambuco (HCP). Ex-Surgical Oncology Resident from CEON/HUOC/UPE.

⁵Surgical Oncology Resident from CEON/HUOC/UPE.

⁶Medical Student from Faculdade Pernambucana de Saúde/IMIP – FPS/IMIP.

Corresponding author: Thales P. Batista. Rua Góis Cavalvante, 100. Ap. 1206. Recife (PE), Brazil. 52060-140. E-mail: t.paulo@bol.com.br.

Data of partial analysis was previously presented (Poster) in the XXVIII Congresso Brasileiro de Cirurgia (2009).

INTRODUCTION

Medical Residency (MR) emerged at around the end of the 19th century as a hands-on specialization for physicians and thus initiated a new concept of human resource training in the medical field, based on the teaching of clinical practice through in-service training^{1,2}.

Nowadays, MR is considered the best way for medical doctors to complete their higher education as specialists, providing in-training physicians with an excellent opportunity to exercise their skills under supervision, in the same conditions under which they will eventually work³.

Although MR may improve medical assistance in health services³, we found that most of the current studies do not objectively demonstrate these improvements. This current study describes a Brazilian oncology center and provides a comparison between pre- vs. MR periods in order to examine the influence of implementing a MR in surgical oncology (SO) at the Oncology Center from Oswaldo Cruz University Hospital, University of Pernambuco (CEON/HUOC/UPE).

METHODS

We retrospectively studied both SO care and academic production at the CEON/HUOC/UPE, from February 1, 2004 to January 31, 2010, using our own database. A cross-sectional study was carried out and a retrospective cohort strategy was applied to compare the pre- vs. MR periods (pre-MR from February 1, 2004 to January 31, 2007 and the MR period from February 1, 2007 to January 31, 2010).

Our analysis focused on variables that could be numerically expressed and possibly statistically compared. Thus, only objective variables were used in the analysis: the amount of ambulatory visits, hospitalizations and elective surgeries, the status of diseases treated (malignant vs. benign), the complexity level of surgical procedures and the area of training in SO. Additionally, we also explored our academic production (i.e.: medical congress presentations and journals publications) between pre- vs. MR periods.

The level of surgical complexity was numerically quantified according to the Brazilian Hierarchical Classification of Medical Procedures Guideline (CBHPM) and stratified into three categories: 4-6, 7-9, and 10-12. This guideline is published by the Brazilian Medical Association and provides a stratification of the various medical procedures with regard to their technical complexity, execution time, postoperative attention required, and level of training necessary for their accomplishment⁴. The classification of surgery

according to the area of training in SO was done following a guideline of the National Committee of Medical Residence (CNRM), which has regulated the content of MR programs in SO in Brazil since 2006⁵. According to this guideline, a MR program in SO must include rotations of surgical training in breast, head-neck, thorax, upper and lower gastrointestinal, soft-tissue/musculoskeletal, gynecology and genitourinary fields.

We also limited this study to medium and major surgical procedures rendered by surgical oncologists that actively involved resident training activities and worked at our Center within both periods (n=7). Procedures performed on outpatients and/or with local anesthesia were excluded, as were surgeries from the head-neck or thoracic field, because their related MR rotations included some activities out of our Oncology Center.

Categorical variables were expressed as proportions (percentages) and compared using the χ^2 tests, including the Yates's correction where appropriate. The statistical analyses were performed using the STATISTICA Data Analysis Software System, Version 8.0 (Statsoft, Inc., Tulsa, OK, USA). A significance level of 0.05 was used in all analyses. This study was registered in the Brazilian National System of Human Research – SISNEP (CAAE – 0128.0.106.000-09) and approved by our Ethics Research Committee (protocol number 126/2009). All procedures complied with the standards of the Declaration of Helsinki and current ethical guidelines.

RESULTS

Between February 2004 and January 2010, 5169 hospitalizations (Pre-MR=2789 vs. MR=2380) and 1937 medium and major surgeries (pre-MR=925 vs. MR=1012) were performed at our Center. There was a statistically significant increase in the proportion of surgeries performed to treat malignant diseases in the MR period (pre-MR=59% vs. MR=70%, $p<0.001$).

The proportion of surgeries among the SO areas had no changes after the MR implementation at our Center ($p=0.301$) (Table 1). Similarly, the MR implementation did not alter the proportion of procedures according to their surgical complexity level ($p=0.999$) (Table 2). Unfortunately, the number of outpatient consultations could not be completely accessed and was excluded from our study.

In the MR period, our academic production included two papers published in international journals, another published in a national journal, four studies presented in international congresses, and another paper presented in a national congress. In the Pre-MR period, just two papers were presented in a Brazilian medical congress.

Table 1. Distribution of surgeries performed before and after the medical residency implementation at our Center according to areas of training in surgical oncology

Period	Surgical Oncology Area – n (%)					p-value
	GU	Skin/STM	GYN	Breast	ABD/GI	
Pre-MR	17 (1.8)	110 (11.9)	357 (38.6)	149 (16.1)	292 (31.6)	0.301
MR	31 (3.1)	101 (10)	383 (37.8)	132 (13)	365 (36.1)	

Abbreviations: GU: genitourinary system; STM: soft-tissue and musculoskeletal; GYN: gynecology; ABD/GI: abdomen and gastrointestinal system

Table 2. Distribution of surgeries performed before and after the medical residency implementation at our Center according to their surgical complexity level

Period	Surgical Complexity Level* – n (%)			p-value
	Level 4-6	Level 7-9	Level 10-12	
Pre-MR	76 (8.2)	350 (37.8)	499 (53.9)	0.999
MR	84 (8.3)	386 (38.1)	542 (53.6)	

* According to the Brazilian Hierarchical Classification of Medical Procedures Guideline

DISCUSSION

The MR programs were officially implemented by the Brazilian National Ministry of Education as postgraduate specialization courses for medical doctors in the 1970s⁶, but they were previously used as a training model since the 1940s^{1,2,7}.

The Hospital das Clínicas of the University of São Paulo and the Hospital dos Servidores in Rio de Janeiro were the first to implement MR programs, in 1944 and 1948, respectively. Gradually, several more programs were created, mainly by public entities, and a National Committee of Medical Residency was created to regulate these courses^{1,2}. Currently, MR programs are the main method to train specialist doctors in our country^{1-3,6,8}. Moreover, this model of training has been developed within a nationally structured program tied to the medical assistance of each location; it works as an educational method serving a public health policy³.

The practice of SO offers the potential for tremendous personal and professional satisfaction. Few careers provide the opportunity to have such profound impact on the lives of others and derive meaning from work⁹. In this specialty, the first Brazilian MR programs were created at the Brazilian National Cancer Institute (INCA) in Rio de Janeiro in 1946 and at the A.C. Camargo Hospital in São Paulo in 1953¹. Currently, there are about 22 MR programs in Brazil, according to the Brazilian Society of Surgical Oncology.

As it has occurred around the world¹⁰⁻¹², training in SO was recently (2006) normalized by the CNRM, which also

adopted a core curriculum guided by medical and surgical competencies⁵. In our country, this new curriculum resulted from a collective initiative to trace a professional profile focused on the requirements of quality and social relevance demanded by society and by the public health system⁸. Nowadays, our core curriculum requires previous training in general surgery followed by specific training in SO for more three years⁵.

On the other hand, to define a surgical oncologist as the only one able to perform oncological procedures is probably incorrect. Many general surgeons or other surgical specialists, by expertise or interest, are also able to conduct oncological cases correctly. Their active participation in conducting the assessment, diagnosis, research in new treatment modalities, and even in the terminal phase of a patient's life with cancer may characterize them as 'specialists' in SO¹³.

The efficiency of SO treatments is, by far, related to technical skills, specific training, caseload, and the interest the surgeon develops in relation to the disease.¹⁴ Thus, among several factors that may influence treatment outcomes in the field of oncology, the surgeon is considered an important variable because his actions can influence the patient's postoperative morbidity, overall survival, disease-free interval, local recurrence rates, and quality of life^{10,11,14}.

The adoption of a core curriculum based on surgical competencies is probably the best way to reduce variations in treatment outcomes and to improve the quality of surgical training^{8,10-12,14}, because the training period is undoubtedly the best opportunity to favorably influence the quality of any future surgical oncologist^{7,8,14-17}.

On the other hand, apart from being considered an important training model for young surgeons, MR may also increase the quantity and improve the quality of the medical services offered by health centers³. Furthermore, in the SO specialty, medical residents are previously trained in general surgery; thus, their participation in medical assistance also promotes an exchange of experiences among young and senior surgeons, which contributes to knowledge renovation and mutual learning of these two generations.

At the CEON/HUOC/UPE, the Department of SO works in an integrated manner with the Departments of clinical oncology, radiotherapy, and pathology to treat different neoplasias in a multimodal approach. However, according to spontaneous demand of patients, surgeries in the fields of gynecology, breasts, and abdomen/pelvis (mainly in the digestive tract) are predominantly performed. Before our MR program, we regularly received residents of gynecology/obstetrics and general surgery from our University and other institutions for rotation at our Center. Finally, in 2007 we initiated our own MR program in SO that offers two new positions for residency a year (CNRM/MEC nº 163/06).

From pre- to MR period, no structural changes occurred at our Center (i.e.: number of hospital beds available), but two new attending surgical oncologists were incorporated. The participation of medical residents was followed by an increase of 9% in the number of medium and major surgeries performed, and by a reduction of 15% in the volume of hospitalizations. Moreover, there was significant statistical increase in the proportion of surgeries carried out to treat malignant diseases at our Center. These rates possible resulted from the improvement of our medical care since the introduction of medical residents in our activities; however they may also have been influenced by other factors which could play as confounding factors (i.e.: worldwide tendency for more outpatient treatment or the development of enhanced oncologic care which would have attracted referrals).

In order to reduce some bias related to these factors, we limited our analysis surgical procedures rendered by surgical oncologists that worked at our Center within both periods (n=7); thus, the production of our two new attending surgeons were not taken into account. Similarly, we excluded procedures performed on outpatients and/or with local anesthesia to limit the effect of tendency for more outpatient treatments, we did not consider surgeries from the head-neck or thoracic rotations either, which included some activities out of our Oncology Center and could influence referrals.

Our high proportion of procedures performed to treat benign diseases was mainly due to the treatment of hernias

and cholelithiasis in oncological patients previously treated at our Center as well as to the hysterectomies performed to treat endometrial hyperplasia in patients using hormone therapy because of breast cancer or to treat large benign uterine tumors.

Despite the greater number of surgeries ranked at the 12th level in the MR period (data not shown), we hoped for some corresponding increase in the level of surgical complexity in this period, which did not occur. Similarly, there were no changes in the proportion of surgeries performed between pre- vs. MR period according to SO areas. Nevertheless, our academic production promisingly increased after the implementation of a MR program in SO at our Center, probably as result of the motivation from residents.

Although MR may improve medical assistance in health services³, most of the current studies lack to objectively demonstrate these improvements. So, we believe our approach provides some scientific merit to this issue because it served to valorize the MR as an important training model for young surgeons and could be used as a tool to evaluate MR programs in different surgical specialties.

CONCLUSION

This study suggests that introduction of an MR program has positively influenced SO care and academic production at the CEON/HUOC/UPE; however, further studies are needed to confirm a cause-effect relationship.

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CONTRIBUTIONS

Each author participated actively and sufficiently in the study with substantial contributions, critical review and final approval of the manuscript version being submitted.

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REFERENCES

1. Silva MGC, Arregi MMU. Medical residency in cancerology in Brazil: distribution of programs and current offer of openings according to region in 2003. *Revista Brasileira de Cancerologia* [serial online]. 2005; 51(1):5-13. [Accessed on Jul 15, 2010] Available at: <http://www.inca.gov.br/rbc/n_51/v01/pdf/artigo1.pdf> ok

2. Universidade Federal de Minas Gerais (Brasil). Serviço especial de saúde do trabalhador do hospital das clínicas. Centro de referência estadual em saúde do trabalhador. Residência de medicina do trabalho [programa 2005]. [Accessed on Jun 10, 2010] Available at: <http://www.hc.ufmg.br/crest/downloads/residencia_medicina_trabalho.pdf>ok
3. Cavalcanti SH. The importance of medical residency. [Medical Society of Sergipe web site]. Available from: http://www.somese.com.br/site/noticia_inteira.php?id=339. Accessed July 7, 2009.
4. Brazilian Medical Association. Brazilian Hierarchical Classification of Medical Procedures. São Paulo: Câmara Brasileira do Livro; 2008.
5. National Committee of Medical Residency (CNRM): MEC. Resolution CNRM/MEC 07/2006 [Brazilian National Ministry of Education web site]. Available from: http://portal.mec.gov.br/index.php?option=com_content&view=article&id=13079&Itemid=506. Accessed July 15, 2010.
6. Brazil. Decreto nº 80.281, set 05, 1977. [Brazilian National Ministry of Health web site]. Available from: http://portal.mec.gov.br/index.php?option=com_content&view=article&id=13079&Itemid=506. Accessed July 15, 2010.
7. Ferreira EA, Rasslan S. Surgical Education in Brazil. *World J Surg*. 2010;34(5):880-3.
8. Ribeiro ECO. Oncology residency programs guided by competence: trajectory of a collective construction. *Revista brasileira de cancerologia [serial online]*. 2007;53(1):99-118. Available from: http://www.inca.gov.br/rbc/n_53/v01/pdf/secao_especial4.pdf. Accessed July 15, 2010.
9. Shanafelt T. A career in surgical oncology: Finding meaning, balance, and personal satisfaction. *Ann Surg Oncol*. 2008;15(2):400-6.
10. Naredi P, Leidenius M, Hocevar M, Roelofesen F, van de Velde C, Audisio RA. Recommended core curriculum for the specialist training in surgical oncology within Europe. *Surg Oncol* 2008;17(4):271-5.
11. Naredi P, Audisio RA, Taylor I. Why do we need a core curriculum in surgical oncology in Europe? *Surg Oncol* 2008;17(4):267-9.
12. Temple WJ, Morton DI, Mattheiem W, Kulakowski A, Guimaraes dos Santos J, Oldhoff J. World Federation of Surgical Oncology Societies. Surgical Oncology training program guidelines. *Eur J Surg Oncol* 1996; 22(5): 538-9.
13. National Cancer Committee of the Brazilian College of Surgeon – CBC. Self-Assessment Program in Surgery. *Surg Oncol* [CBC web site]. Available from: http://www.cbc.org.br/upload/emc/autoavaliacao/concologica/1/cirurgia_oncologica.htm. Accessed July 15, 2010.
14. Souza-Filho, O. Oncologic Surgeon: a prognostic factor in the treatment of cancer. *Revista brasileira de cancerologia [serial online]*. 2004;50(2):91-3. Available on: http://www.inca.gov.br/rbc/n_50/v02/pdf/OPINIAO.pdf. Accessed July 15, 2010.
15. Bilimoria KY, Phillips JD, Rock CE, Hayman A, Prystowsky JB, Bentrem DJ. Effect of surgeon training, specialization, and experience on outcomes for cancer surgery: a systematic review of the literature. *Ann Surg Oncol*. 2009;16(7):1799-808.
16. Jesus LE. Teach surgery: how and for whom? *Revista do Colégio Brasileiro de Cirurgiões* 2008; 35(2):136-40.
17. Jesus LE. Surgeons train: always like today? *Revista do Colégio Brasileiro de Cirurgiões* 2009; 36(6):529

Resumo

Objetivo: O objetivo deste estudo foi analisar o impacto da criação do programa de Residência Médica (RM) em Cancerologia Cirúrgica do Centro de Oncologia do Hospital Universitário Oswaldo Cruz, Universidade de Pernambuco (CEON/HUOC/UPE). **Métodos:** Realizou-se estudo transversal com análise tipo coorte retrospectivo para comparação dos períodos pré e pós-RM, usando variáveis numéricas relacionadas à assistência prestada como desfechos primários. Explorou-se, também, a produção acadêmica do Serviço. **Resultados:** Observou-se um aumento de 9% no número de cirurgias realizadas, bem como uma redução de 15% no número de hospitalizações após o início do programa de RM em avaliação. Houve um aumento estatisticamente significativo da proporção de cirurgias realizadas para o tratamento de doenças malignas no período pós-RM (59% vs. 70%; $p < 0,001$), sem mudanças na proporção destes procedimentos segundo seus níveis de complexidade ($p = 0,999$) ou áreas de atuação da especialidade de cancerologia cirúrgica ($p = 0,301$). A produção acadêmica do Serviço em estudo aumentou promissora no segundo período. **Conclusões:** Este estudo sugere que a criação do programa de RM em Cancerologia Cirúrgica do CEON/HUOC/UPE influenciou positivamente sua assistência cirúrgica oncológica e produção acadêmica; no entanto, mais estudos seriam necessários para confirmar uma estrita relação de causa-efeito. Esta abordagem também serviu para valorizar a RM como um importante modelo de formação de novos cirurgiões e poderia ser usada como um modelo para avaliação dos programas de RM em diferentes especialidades cirúrgicas.

Palavras-chave: Residência médica; Assistência ao paciente; Educação médica, Recife, PE

Resumen

Objetivo: El objetivo de este estudio fue analizar el impacto de la creación del Programa de Residencia Médica (RM) en Oncología Quirúrgica del Centro de Cáncer del Hospital Universitario Oswaldo Cruz, Universidad de Pernambuco (CEON/HUOC/UPE). **Métodos:** Se realizó un estudio transversal y se llevó a cabo una estrategia de cohortes retrospectivo comparar variables numéricas relacionadas con la asistencia quirúrgica prestada antes y después de la creación del programa de RM en estudio. Se exploró también la producción académica del Centro. **Resultados:** Un incremento del 9% en el número de cirugías realizadas, así como una reducción del 15% en el número de hospitalizaciones se observó después de la RM. Hubo un aumento estadísticamente significativo en la proporción de cirugías para el tratamiento de tumores malignos en el período post-RM (59% vs 70%, $p < 0,001$), sin cambios en la proporción de estos procedimientos en sus niveles de complejidad ($p = 0,999$) o áreas de especialidad de la oncología quirúrgica ($p = 0,301$). Nuestra producción académica aumentó considerablemente en el segundo período. **Conclusiones:** Este estudio sugiere que la introducción del programa de RM en Oncología Quirúrgica ha influido positivamente en la atención quirúrgica y la producción académica en nuestro Centro de Oncología; sin embargo, se necesitan más estudios para confirmar una relación causa-efecto. Nuestro enfoque también ha servido para valorar la RM como un importante modelo de formación para los jóvenes cirujanos y podría ser utilizado como una herramienta para evaluar los programas de RM en diferentes especialidades quirúrgicas.

Palabras clave: Internato e Residência; Assistência ao Paciente; Educação Médica; Recife, PE