

▪ 2022, 4(1):5-9 ▪ e-ISSN: 2674-7103

Jornal Memorial *da* Medicina

▪ DOI: 10.37085/jmmv4.n1.2022.pp.5-9

Review

William F. J. Harkness and his contributions to pediatric neurosurgery

Otávio da Cunha Ferreira Neto[1], Maria Carolina Paiva Lima[1], Gabriel Antas Florentino[1], Gabriel Duarte Lemos[1], João Ricardo Caldas Pinheiro Pessôa[1], Joaquim Fechine de Alencar Neto[4], Luiz Severo Bem Junior[2,3,4], Nivaldo Sena Almeida[3], Hildo Rocha Cirne de Azevedo Filho[3]

[1]Catholic University of Pernambuco, Recife, Pernambuco, Brazil
[2]Neuroscience Post-Graduate Program, Federal University of Pernambuco, Recife, Pernambuco, Brazil
[3]Department of Neurosurgery, Restauração Hospital, Recife, Pernambuco, Brazil
[4]College of Medical Sciences, Unifacisa University Center, Campina Grande, Paraíba, Brazil

Otávio da Cunha Ferreira Neto
otaviocferreiraneto@gmail.com

Editad by:
Juliana Ramos de Andrade

Keywords:
Neurosurgery
Pediatrics
Review
William F. J. Harkness
Epilepsy
History

Abstract

Dr. William F. J. Harkness, a pediatric neurosurgeon and an international authority on the surgical management of epilepsy contributed in an exemplary manner throughout their academic life. To improve the quality of life of several patients in a direct and indirect way, through their methods, teachings, and writings. Aiming to elucidate and understand Dr. William's history and collaboration for neurosurgery, a retrospective review was carried out. Mr. William has one of the largest clinical series of epilepsy surgery, through this trajectory has been recognized worldwide, being a member of fundamental importance for several entities such as International Society for Pediatric Neurosurgeons (ISPN). The contribution of Mr. Harkness is remarkable and, in addition to benefiting many patients, especially epileptics, it has helped in the growth of the neurosurgical specialty aimed at the pediatric public.

Received: December 29, 2021
Accepted: April 20, 2022

© Copyright 2022

Introduction

William F. J. Harkness was educated at Eton School, and he studied medicine in 1979, at the University of Birmingham, United Kingdom. His neurosurgical training started at the Radcliffe Infirmary, Oxford and later continued in Birmingham. He became a fellow of the Royal College of Neurosurgeons of England in 1984 and then embarked upon his neurosurgical career. It was there that he met his future influential mentor Tony Hockley, past president of the International Society for Pediatric Neurosurgeons (ISPN). They became William's lifelong friend and inspired his interest in pediatric neurosurgery (Figure 1).[1]

Upon completion of his specialist training in 1991, William was appointed as a consultant neurosurgeon the same year at the National Hospital for Neurology and Neurosurgery, Queen Square and pediatric neurosurgery at Great Ormond Street Hospital for Sick Children, but it was the latter institution that became his professional home as he focused his career on pediatric neurosurgery, establishing a legendary partnership with Richard Hayward.[1,2]

At that time, epilepsy surgery, particularly in children, was still not common in the UK. Under William's guidance, epilepsy surgery quickly became notorious at both institutions, and, within 15 years, William had one of the largest clinical series of epilepsy surgery in the world and had become an international authority.[1,2] In view of this data, this present study has the objective to review William F. J. Harkness and your contributions to pediatric neurosurgery, especially to epilepsy surgery.



Figure 1. With Tony Hockley and Jim Goodrich (inaugural ISPN Presidents' honored guest 2017) on Tony's retirement in 2005.

Methods

The present study is a narrative review of the literature and intends to address the professional trajectory of William F. J. Harkness, highlighting his contributions to pediatric neurosurgery. This retrospective review was produced from the research of scientific articles published until 2021, based on the Medical Literature Analysis and Retrieval System Online (MedLine/PubMed). The keywords used for the search in the database were: ("William Harkness'' AND "pediatric neurosurgery") OR ("William Harkness'' AND historical AND review) OR ("William Harkness'' AND" epilepsy surgery") OR ("William Harkness'' AND neurosurgery) OR "William Harkness''.

Results

From the search in the databases 65 articles were obtained. Those that did not allow complete reading were eliminated, as well as those whose analysis of the summary and reading of content did not fit the desired search profile. In the end, 13 articles remained for this work. This review looks back on Mr. William Harkness main contributions to pediatric neurosurgery around the world.

Discussion

Achievements in pediatric neurosurgery and contributions

After he was appointed as consultant neurosurgeon in 1991, where he went ten years leading the pediatric neurosurgical department at Great Ormond Street Hospital (GOSH), with Richard Hayward, he has been tasked to developing an epilepsy program at Queen Square and Great Ormond Street, needing to travel for one year to North America to get more training in epilepsy surgery, at UCLA, Miami, Seattle and the Montreal Neurological Institute.[1] Back to England, he embraced the multidisciplinary team approach, enabling him to establish a world-leading children's epilepsy surgery service together with Heln Cross at the GOSH.[3]

Mr. William has one of the largest clinical series of epilepsy surgery and has been invited to lecture overseas on more than 50 occasions covering all the world. The Society of British Neurological Surgeons (SBNS) has elected him twice for a member of Council. He helped to spread the practice of pediatric epilepsy surgery both nationally and internationally through the International League Against Epilepsy (ILAE).[1,3]

In 2015, he was elected to serve as president of the International Society of Pediatric Neurosurgeons (ISPN), where, among other contributions, gave voice to the importance of the role of nursing in the specialty. At his presidential, he tried to highlight the inequalities of access to pediatric neurosurgical care around the world.[1] Furthermore, combining his organizational and technical skills, he worked with Jim Johnson to develop InterSurgeon, a web-based platform promoting international collaboration through linking neurosurgeons and related organizations across the world.[3]

Epilepsy surgery

The operative techniques used in the surgical treatment of epilepsy have evolved in parallel to other branches of neurosurgery, with the contribution of renowned neurosurgeons. Mr. Harkness has contributed with a series of research, together with others research, on the subject. For example, in one of his personal series he analyzed the difference between the nature of pediatric epilepsy surgery practice when compared with adult practice through the underlying pathology in patients underwent temporal lobe resection, from the Great Ormond Street Hospital for Children and The National Hospital for Neurology and Neurosurgery, respectively. In this survey, the results showed that, whereas hippocampal sclerosis predominated within the adult group, in the pediatric population, low grade neoplasms or developmental lesions were much more common.[1]

In 2013, Harkness and his collaborators published an important work on determining, for the first time, the state of epilepsy surgery in the United Kingdom since 2000, separating the number of pediatric and adult surgical epilepsy procedures performed during a 1-year period. In this survey he analyzed the numbers for all procedures apart from vagus nerve stimulation implantations (57% of the procedures) have decreased relative to the year 2000, in contrast to the findings of an ILAE survey of international pediatric practice in the United States, Europe and Australia, where the VNS implantation accounted for only 15.8%.[2]

Furthermore, he committed to study about the importance of the pre-surgical evaluation of the children who would undergo epilepsy surgery. In more than one survey, the use of MRI proved to be of great value for the indication of the surgical process.[4,5] More recently, in 2019, a longitudinal case-control neuroimaging study, analyzed clinical and neuroimaging factors associated with cognitive outcome after epilepsy surgery childhood, pointing out, as result, that the IQ improvement was seen in children treated surgically, but not in those treated pharmacologically only.[6]

Mr. William Harness positions

William has executed neurosurgical greatness. He has been for two times an elected member of the Council of the Society of British Neurological Surgeons (SBNS), could represent on the national service framework committee for long-term neurological conditions and could have worked for the Royal College of surgeons of England in monitoring surgical decisions. William has helped to shape the practice of pediatric epilepsy surgery internationally through roles in the International League Against Epilepsy (ILAE) and Epilepsy Action and as adviser to NHS England and NHS Scotland for Children's Epilepsy Surgery Services.[1,2]

Being awarded by the ISPN Poncho, was the highest point of his career. He used his presidential term to immense effect in trying to highlight the inequalities of access to pediatric neurosurgical expertise around the world. He was recognized as President of the ISPN 2016-2017, and inspired by an Jonh Dryden, a English poet, his presidential address at the ISPN meeting in Denver was entitled: '2017 – annus mirabilis A Global View of Neurosurgery for Children' (doing reference by the J. Dryden poem "annus mirabilis") and recounted a year-long neurosurgical odyssey in which he had visited many parts of the underdeveloped and developing world, and, like Dryden, he has hope that will have improvements the scenario of Global Neurosurgery for Children so that, in the future, all children have the right to have access to safe and optimized neurosurgical treatment.[1,2]

Despite doing a lot of things in his presidency, he wrote that this position is much brief and, therefore, to achieve any realistic goals during the period of tenure is only possible with the collaboration and commitment of all the presidents who will occupy the position. Fortunately, he had Professor Graham Fieggen as a successor, who shared with him a desire to improve neurosurgery care on a global scale for children.[1,2]

Surgical care globally: InterSurgeon

The InterSurgeon is a website designed from the joint vision of Doctor Harkness and Jim Johnston, also a pediatric neurosurgeon. The goal is to bring individuals and organizations together in partnerships to improve surgical care globally. The idea came up in 2017, but only started to be active in March 2018. It is known that about 143 million surgical procedures are needed each year, with 15% of those being neurosurgical cases, majority in locations with the lowest access. The need to create InterSurgeon comes from the current reality to change the disparity in access to safe,

timely and affordable surgical and anesthetic care, since this care is inefficient to 5 billion people in the world, as demonstrated by the Lancet Commission in 2015.[7]

In the beginning, it was dedicated to pediatric neurosurgery, but has expanded to include adult neurosurgery and urological surgery, until, in March 2019. InterSurgeon signed a cooperation agreement with the G4 Alliance, which provides a collective voice in support of increased access to safe surgical care for all in the departments of surgical, obstetric, trauma and anesthesia care, encompassing the entire spectrum of surgical and anesthetic subspecialties. Through this online platform, physicians can create profiles, with information about institution, language spoken, surgical practice, expertise, equipment availability, training needs and academic interests, and an automated matching algorithm is realized, joining mentor and learner surgeons.[8]

Beyond the expected, the collaborations were not just commonly formed between surgeons and institutions from high-income countries (HICs) and low to middle-income countries (LMICs), but there were several instances in with partnerships developed between 2 middle-income countries or low-income countries, what is one of the most important outcomes of the InterSurgeon platform. The intent of increasing global partnerships in neurosurgery can potentially facilitate international education, clinical guidance, training, and research.[7-9]

In this way, living up to his desire to build a pediatric neurosurgery global, the creation of InterSurgeon has become a lasting tribute to his vision and drive.

William Harkness family

Behind all great person's figures, there is often a family who must endure the long and unpredictable working hours, countless international travel, and engagements as well as the emotional highs and lows that are an inevitable consequence of the pediatric neurosurgical psyche. His wife Philippa was always present most of the times when he needed to travel, and in all his conversations, she never failed to share the news on the adventures of Edward, Fran, Gabi and Letitia and their growing families. William and Philippa had four children and now four grandchildren (Figure 2). Through all the demands and achievements of an international pediatric neurosurgical career, the concept of family remains the 'essence' of William Harkness.[1]



Figure 2. Mr. William Harkness family; (Cornwall, May 2018).

Conclusion

The contribution that Mr. William Harkness to pediatric neurosurgery, in particular surgery for epilepsy in children, is remarkable, and he is considered one of the leading pediatric neurosurgeons. Furthermore, to benefiting thousands of children with his surgical skills, William participated in the growth of the specialty through a succession of carefully considered '5-year plans' at local, national, and international levels. The development of InterSurgeon was one of William's major creations aimed at promoting international collaboration, linking neurosurgeons and related organizations, which contributed to the globalization of pediatric neurosurgery. Therefore, Mr. William Harkness left several legendary contributions that should be remembered and respected, as the impact of his achievements is immeasurable for professionals and patients.

Conflicts of Interest
The authors declare that there is no conflict of interest regarding the publication of this paper.

Funding Statement
The authors declare that neither the research nor the publication of this paper was funded by any financially supporting bodies.

Authors' contributions
Otávio Ferreira: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Resources, Writing-Original Draft, Project administration, Supervision. **Maria Carolina**: Data curation, Writing- Original draft, Investigation,

Formal analysis, Resource, Writing-Review & Editing. **Gabriel Antas:** Data curation, Writing- Original draft, Investigation, Formal analysis, Resource, Writing-Review & Editing. **Gabriel Duarte**: Data curation, Writing- Original draft, Investigation, Formal analysis, Resource, Writing-Review & Editing. **João Ricardo**: Data curation, Writing- Original draft, Investigation, Formal analysis, Resource, Writing-Review & Editing. **Joaquim Fechine**: Data curation, Writing- Original draft, Investigation, Formal analysis, Resource, Writing-Review & Editing. **Luiz Severo:** Data curation, Writing- Original draft, Investigation, Formal analysis, Resource, Writing-Review & Editing. **Nivaldo Sena**: Data curation, Writing- Original draft, Investigation, Formal analysis, Resource, Writing-Review & Editing **Hildo Rocha Cirne**: Conceptualization, Validation. Formal analysis, Resources, Project administration, Supervision., Project administration, Supervision.

Otávio da Cunha Ferreira Neto
https://orcid.org/0000-0003-0517-0212
Maria Carolina Paiva Lima
https://orcid.org/0000-0001-9065-8030
Gabriel Antas Florentino
https://orcid.org/0000-0002-9711-4535
Gabriel Duarte Lemos
https://orcid.org/0000-0001-5759-6624
João Ricardo Caldas Pinheiro Pessôa
https://orcid.org/0000-0002-0612-6478
Joaquim Fechine de Alencar Neto
https://orcid.org/0000-0003-2042-4874
Luiz Severo Bem Junior
https://orcid.org/0000-0002-0835-5995
Nivaldo Sena Almeida
https://orcid.org/0000-0003-0925-8473
Hildo Rocha Cirne de Azevedo Filho
https://orcid.org/0000-0002-1555-3578

References

1. Thompson DNP. **William Harkness, president of the ISPN 2016–2017**. *Child's Nervous System* 2018;34(10):1813-1815 Doi:10.1007/s00381-018-3919-2
2. Harkness WFJ. **Presidential address 2017 William Harkness FRCS October 10th 2017 Denver, Co USA: 2017—annus mirabilis, a global view of neurosurgery for children**. *Child's Nervous System* 2018;34(10):1817-1836 Doi:10.1007/s00381-018-3931-6
3. Shaefi S and Harkness W. **Current Status of Surgery in the Management of Epilepsy**. *Epilepsia* 2003;44:43-47 Doi:10.1046/j.1528-1157.44.s.1.15.x
4. Neligan A, Haliasos N, Pettorini B, Harkness WFJ and Solomon JK. **A survey of adult and pediatric epilepsy surgery in the United Kingdom**. *Epilepsia* 2013;54(5):e62-e65 Doi:10.1111/epi.12148
5. Cross JH, Gadian DG, Chong WK, Clark CA, Harkness W, Liégeois F, . . . De Tiège X. **Influence of Motor Functional Magnetic Resonance Imaging on the Surgical Management of Children and Adolescents with Symptomatic Focal Epilepsy**. *Neurosurgery* 2009;64(5):856-864 Doi:10.1227/01.Neu.0000343741.54200.58
6. Patil SG, Cross JH, Kling Chong W, Boyd SG, Harkness WJ, Neville BGR and Scott RC. **Is streamlined evaluation of children for epilepsy surgery possible?** Epilepsia 2008;49(8):1340-1347 Doi:10.1111/j.1528-1167.2008.01538.x
7. Skirrow C, Cross JH, Owens R, Weiss-Croft L, Martin-Sanfilippo P, Banks T, . . . Baldeweg T. **Determinants of IQ outcome after focal epilepsy surgery in childhood: A longitudinal case-control neuroimaging study**. *Epilepsia* 2019;60(5):872-884 Doi:10.1111/epi.14707
8. Lepard JR, Akbari SHA, Haji F, Davis MC, Harkness W and Johnston JM. **The initial experience of InterSurgeon: an online platform to facilitate global neurosurgical partnerships**. *Neurosurg Focus* 2020;48(3):E15 Doi:10.3171/2019.12.FOCUS19859
9. Harkness W. **Temporal lobe resections**. *Child's Nervous System* 2006;22(8):936-944 Doi:10.1007/s00381-006-0140-5