EDITORIAL

The Shadow-Side of the Neurological Evaluation

O Lado-Sombra do Exame Neurológico

José Pimentel [1,*]
1-Laboratório de Neuropatologia/Serviço de Neurologia, Hospital de Santa Maria, Centro Hospitalar Lisboa Norte, Lisboa, Portugal

DOI: https://doi.org/10.46531/sinapse/ED/220037/2022

Introduction

I read the excellent and very interesting article of our colleague Rui Araújo[1] and it made me to decide to published my own one, both addressing themes not frequently red in "Sinapse".

A few general medical[2] and neurological journals[3-7] aim to teach neurological evaluation but the themes addressed are either particularly specific or more appropriate for specialists rather than for residents. Over the past 35 years, teaching neurology to the medical students and the neurology residents of my institution, I became aware that, besides their learning of "what must be taught "compulsorily" which may be read in any neurological textbook, many important aspects that remain "in the shadow" of the classic neurological symptoms and signs, should be addressed.

Many years ago, I read somewhere that a fair neurological history and examination should answer the two principal questions in clinical neurology, "where is it and what type of lesion is it?" in about seventy percent of the cases, the remaining thirty percent being achieved by the ancillary investigation.

To accomplish this goal, the resident must know at least the basic neuroanatomy, "there is no way around it". Furthermore, thinking that the great number of ancillary exams at our disposal nowadays will "solve the problem" is completely wrong. Investigations should be required to confirm our main diagnostic hypothesis only, or rule out any other. Besides, there are several neurological diseases, such as migraine, for which the diagnosis may be decided entirely by the history alone. It is the perception of all older clinical neurologists, that our experience increases, fewer tests are ordered. However, it is "better to go wrong by excess then by defect"!

The neurological residents of my department invited me to talk about the neurological examination but I decided to shed some light on the above mentioned "shadow". The examination of the uncooperative or the comatose patient was outside the scope of the topic.

Neurological History

Besides the fact that all neurological symptoms must be addressed, and each should be carefully detailed (e.g., headaches, pain, vision disturbances), it is advisable that one, preferably two, diagnostic hypotheses start being "built up" in the residents 'mind as the history is revealed. At this point, three scenarios may be faced: a) The patient spontaneously tells us the symptoms (in his or her own way!) and we just have to direct the questions to be certain we obtain the right information (e.g., the patient refers to dizziness but the true symptom is vertigo, which has a completely different significance, or vice-versa. b) We have to ask other questions, related to the symptoms reported by the patient (e. g., if the patient has vertigo, we should also ask about loss of hearing, tinnitus, etc.). c) We have to ask about all the other neurological symptoms not mentioned by the

Informações/Informations:
Editorial, publicado em Sinapse, Volume 22, Número 2, abril-junho 2022. Versão eletrónica em www.sinapse.pt; Editorial, published in Sinapse, Volume 22, Number 2, April-June 2022. Electronic version in www.sinapse.pt

***Autor Correspondente / Corresponding Author:**
José Pimentel
Av. Prof. Egas Moniz,
1649- 035 Lisboa, Portugal
josepimentel@medicina.ulisboa.pt

Recebido / Received: *2022-05-12*
Aceite / Accepted: *2022-05-26*
Publicado / Published: *2022-06-30*

patient, which, if not presented, I refer to as "denials".

In addition, the resident must bear in mind the very frequent involvement of the nervous system by systemic diseases and the consequent questions to rule out this possibility, when appropriate. Conversely, some general symptoms may belong to primary neurological disturbances (e. g., vomiting caused by area postrema lesions).

In my view, there is no great benefit in taking a comprehensive past history from the patient and relatives. So, I teach the residents to ask about those diseases that form their first or second diagnostic hypothesis.

At the end of the neurological history, everything should fit with the resident´s hypothesis. If not, he revises his first diagnosis!

Neurological Examination

The resident should not be worried by the fact the patient may not be correctly or ideally positioned. Most of the examination can be performed with the patient lying in bed, even if with a little more difficulty (e. g., visual fields, stretched arms manoeuvres, etc.). The exceptions being for Romberg manoeuvre or examination of gait.

The neurological examination is prolonged and the fatigue of the patient or of the resident must be taken in account to it to be successful. A "coffee break" is sometimes welcomed!. Furthermore, a detailed explanation of each step of the neurological examination should be given to the patient in order to get as few erroneous answers as possible.

The resident should have a strategy in mind to start the examination that should be suggested by the history (e. g., **1.** Left hemiparesis? Most probably a right pyramidal tract lesion. Tonus, strength, osteotendinous reflexes and plantar responses of both sides to be compared. Be cautious, however, because acute pyramidal tract lesions may course with decreased tonus and amplitude of the osteotendinous reflexes very often: **2.** Decreased strength and sensibility of distal limbs? A peripheral neuropathy most probably. Tonus, strength of the more proximal limb segments, osteotendinous reflexes, and proprioceptive and superficial sensibility of limbs and arms to be compared).

The decision for which part of the examination to start should be of the resident own choice but I always suggest starting by the manoeuvres potentially affected and dictated by the neurological history and, then, to complete it. I also always say that each one should have his "own way" of performing the examination and "not to do as the others do".

In my experience, the steps of the neurological examination that are most difficult to perform are: **1.** II cranial nerve, although, if well examined, the resident is able to acquire a fair notion of its function; the accurate evaluation of visual fields, visual acuity and fundoscopy is performed by the neuro-ophthalmologist; **2.** III cranial nerve- oculo-motor reflex may be difficult to perform due to the lighting in the room; **3.** V cranial nerve- evaluation of the sensitive and motor findings, and performance of the corneal reflex; **4.** VIII cranial nerve- similar to the II cranial pair, this time seeking the collaboration of the otoneurologist; **5.** X cranial nerve- Otolaryngologist collaboration may once again be needed in order to study the vocal chords; **6.** Supranuclear visual motor system (saccades, pursuit, etc) and nystagmus- in my opinion, an otoneurologist is often welcome; **7.** Tonus- great subjectivity and eventually affected by the presence of osteo-articular disturbances; **8.** Reflexes- a). cutaneous- presence of cutaneous scars and abnormal adipose panicle; b). osteotendinous- if asymmetric, the real meaning may be difficult to access; c). Plantar cutaneous: a refined technique is required. The reflex should not be repeatedly elicited because, as for all reflexes, a latency time is required. Furthermore, enough strength must be applied to the sole of the foot. Finally, which "extension response" of the large toe should be considered as abnormal? Immediately after starting the stimulation, no matter the final position of the toe? The first ever extension of the toe after stopping the stimulation, even if the toe returns to the initial position? Or the last ever toe response in the same conditions? I have to say this "problem is not solved in my mind"; **9.** Sensibility- most frequent the superficial, pain and tactile, and vibration. Consider the need to prick with a needle or make a tuning fork vibrate on a place where changes of these sensibilities are not expected, like the centre of the chin (in my experience there is no need to place the turning fork out of the head to avoid the patient to listen to instead of to feel the vibration), and to ask the patient which sensation he feels; start with the distal extremities according to the chosen strategy and, in the case of vibration sensitivity, make sure the fork vibrates always with the same strength, and that the observer starts vibrating it de novo for every new location/site;

the patient should be asked to quantify the sensation he feels compared with the initial one, and the resident should not to forget to come back to the chin from time to time to make sure the patient gives the same answer as the one at the beginning.

Conclusion

Standard neurological evaluation still is, and will be in the future, in my opinion, the appropriate way to first address neurological disorders. Although resident neurologists are unlikely to know all of them, they should try!

They should focus on the neurological evaluation as the first approach to the patient. Also, I advise them not sub- specialize to soon.

Finally, I urge them to take advantage of working in a department with other residents and older, well-trained, neurology consultants of different subspecialties, and ask, ask them a lot and always! ■

Responsabilidades Éticas

Conflitos de Interesse: Os autores declaram não possuir conflitos de interesse.

Suporte Financeiro: O presente trabalho não foi suportado por nenhum subsidio o bolsa ou bolsa.

Proveniência e Revisão por Pares: Comissionado; sem revisão externa por pares.

Ethical Disclosures

Conflicts of Interest: The authors have no conflicts of interest to declare.

Financial Support: This work has not received any contribution grant or scholarship.

Provenance and Peer Review: Commissioned; without external peer review.

References / Referências

1. Araújo R. Serendipidade e a arte da neurologia clínica. Sinapse. 2022; 22:4-6. doi: 10.46531/sinapse/ED/220021/2022.
2. Laguna Jf, Stillman PL. Teaching undergraduate attendants the neurological examination. J Med Educ. 1978; 53:990-2. doi: 10.1097/00001888-197812000-00007.
3. Salandy S, Rai R, Gutierrez S, Ishak B, Tubbs RS. Neurological examination of the child: a comprehensive review. Clin Anat. 2019; 32:770-7. doi: 10.1002/cu.23352.
4. Seraji- Bzorgzad N, Paulson H, Heidebrink J. Neurological examination in the elderly. Hand Clin Neurol. 2019; 167:73-88. doi: 10. 1016/B978-0-12-804766-800005-4.
5. Han SG. Kim YD. Kong TY, Cho J. Virtual reality-based neurological examination teaching tool (VIRNET) versus standardized patient in teaching neurological examinations for the medical students: a randomized, single-blinded study. BMC Med Educ. 2021; 21:493. doi: 10.1186/s12909-021-02920-4.
6. Hillis JM, Milligan TA. Teaching the neurological examination in a rapidly evolving clinical climate. Semin Neurol. 2018; 38:428-440. doi: 10. 1055/s-0038-1667135
7. Oster C, Farhood I, Klebes S, Kleinschmitz C, Peters L. Neurological examination course in an interactive webinar as during a pandemic. An overview of the implementation, optimization as well as critical consideration. GMS J Med Educ. 2021;38 :Doc9. doi: 10.3205/zma001405.