PRIMARY HEALTH CARE AS A GUIDELINE FOR UNDERGRADUATE MEDICAL EDUCATION:

THE CRANIAL NERVES

JEAN H. D. FASEL, GENF[1]

Summary

This study is part of a comprehensive work directed toward the development of a medical curriculum based on the specific requirements of primary health care. The present article reports the results concerning the anatomy of the cranial nerves. The following conclusions have emerged from a questionnaire directed to Swiss general medical practitioners: 1.) 96,1% of the structures were agreed upon by all those asked. 2.) Only 10,3% of the structures were considered to be relevant to general medical practice. 3.) Knowledge of descriptive anatomy was thought to be less important than demonstrable clinical function.

Die Allgemeinmedizin als Richtschnur für den vorklinischen Unterricht: Das Beispiel der Hirnnerven-Anatomie

Zusammenfassung

Die vorliegende Arbeit ist Teil einer Gesamtstudie, deren Ziel darin besteht, zur Entwicklung eines auf die spezifischen Bedürfnisse der Allgemeinmedizin ausgerichteten Curriculums für Medizinstudenten beizutragen. Der vorliegende Artikel stellt die Ergebnisse zur Anatomie der Hirnnerven vor. Nach einer Umfrage bei einer repräsentativen Stichprobe von Schweizer Allgemeinpraktikern ergaben sich folgende Resultate: 1.) Für 96,1% der in der internationalen anatomischen Nomenklatur im Zusammenhang mit den Hirnnerven repertorierten Begriffe bestand unter den Befragten völliger Konsens. 2.) Nur 10,3% besagter Strukturen wurde allgemeinmedizinische Relevanz zugebilligt. 3.) Kenntnisse der deskriptiven Anatomie wurden der Kenntnis klinisch prüfbarer Funktionen untergeordnet

Introduction

Attempts to bring medical training into line with the needs of general practice are numerous.[1,2] Understandably, these attempts have been predominantly directed towards the student's clinical period. The author believes, however, that preclinical teaching also has a part to play in the specific training of future general practitioners. In connection with anatomy, for example, think of the palpation of internal organs, the assessment of neurological function or the interpretation of CT- and MR-images. One of the prerequisites for such specific instruction is a sound analysis of what is required. Up to now such investigations have been - so far as anatomy is concerned - very few and far between.[3]

The first object of the study, therefore, is to lay the anatomic basis of specific training for future family physicians by means of a detailed analysis of their particular needs and requirements.

The time assigned for the teaching of anatomy to medical undergraduates was drastically reduced during the 'sixties everywhere in the world.[4] As a result of this restriction, numerous attempts have been made to adapt the organisation and occasionally the content to the altered circumstances.[5] But views on the basic concepts - and following these the concrete measures put forward - differ markedly from one another. To put it succintly: an extreme standpoint has been adopted by those who

[1] Department of Morphology, University Medical Center, Geneva, Switzerland

Table 1. Functions of the cranial nerves as listed in standard references[10-12]

Cranial nerve		motor[1]	sensory[2]	visceral[3]
I	**Olfactory**		smell	
II	**Optic**		sight	
III	**Oculomotor**	levator palpebrae superioris, all extraocular muscles except the superior oblique and lateral rectus		parasympathetic: sphincter pupillae and ciliary muscle
IV	**Trochlear**	superior oblique		
V	**Trigeminal**	muscles of mastication, mylohyoid, anterior belly of digastric, tensor tympani and tensor veli palatini	skin of face in 3 areas, tissues from skin to mucous surface in the same 3 areas, among many others: cornea, most of the dura mater	
VI	**Abducens**	lateral rectus		
VII	**Facial**	muscles of facial expression, stapedius, stylohyoid and posterior belly of digastric	parts of external ear, external stratum of tympanic membrane; taste from anterior two-thirds of tongue	parasympathetic: lacrimal gland, glands of nose, palate and tongue, sublingual and submandibular gland
VIII	**Vestibulocochlear**		hearing and balance	
IX	**Glossopharyngeal**	stylopharyngeus and superior pharyngeal constrictor	middle ear, auditory tube, naso- and oropharynx, parts of isthmus faucium (including undersurface of the soft palate, palatine tonsils, pharyngeal arches, posterior third of tongue); taste from posterior third of tongue; carotis sinus	parasympathetic: parotid gland
X	**Vagus**	muscles of soft palate, muscles of pharyngeal arches, salpingopharyngeal muscle, muscles of oro- and laryngopharynx, muscles of larynx, cranial parts of oesophagus	parts of dura mater in the posterior cranial fossa, parts of external ear, parts of isthmus faucium, oro- and laryngopharynx, epiglottis (taste), larynx, trachea, lungs, stomach, gut down to about the left colic flexure, liver, pancreas, perhaps spleen and kidney	parasympathetic: myocardium, all smooth muscle and all glands of the regions mentioned under the sensory functions in the neck, thorax and upper abdomen
XI	**Accessory**	sternomastoid and cranial part of trapezius		
XII	**Hypoglossal**	intrinsic and extrinsic muscles of tongue, palatoglossus excepted		

1) somatic and branchial efferent (GSE, SVE)
2) somatic and visceral afferent (GSA, SSA, GVA, SVA)
3) visceral efferent (GVE)

Table 2. Functions of the cranial nerves relevant to general medical practice as determined in the present study.

Cranial nerve		motor	sensory	visceral
I	**Olfactory**		smell	
II	**Optic**		sight	
III	**Oculomotor**	levator palpebrae superioris, all extraocular muscles except the superior oblique and lateral rectus		sphincter pupillae
IV	**Trochlear**	superior oblique		
V	**Trigeminal**		skin of face in 3 areas, cornea	
VI	**Abducens**	lateral rectus		
VII	**Facial**	muscles of facial expression		
VIII	**Vestibulocochlear**		hearing and balance	
IX	**Glossopharyngeal**		isthmus faucium	
X	**Vagus**	soft palate, pharynx, larynx		parasympathetic: myocardium, all smooth muscle and all glands of neck, thorax and upper abdomen
XI	**Accessory**	sternomastoid and cranial part of trapezius		
XII	**Hypoglossal**	muscles of tongue		

represent pure traditional gross anatomy and reject any attempt at reduction, while on the other hand, we find fundamental morphologists who regard classical anatomy as of no interest, since it has long been exhausted as a field for research. Finally, an intermediate position is taken by certain clinicians who maintain that anatomy is indispensable, particularly for surgeons and radiologists, but seek a severe reduction in the content to what they regard as essential.
Between these opinions, this study is intended to indicate a middle way, insofar as it advocates a basic anatomical knowledge which is orientated towards general medical practice. Using this as a starting point, more detailed anatomy would then be studied during the postgraduate curriculum, according to the specific needs of the clinical speciality chosen.

The following paper reports the results concerning the cranial nerves.

Materials and methods

A questionnaire was circulated among a sample chosen from the total population of Switzerland's general practicioners as defined in terms of the theory of statistical probability. A full discussion of the statistical methods employed is provided in the pilot study[6] and in the report concerning the arteries.[7] In summary, out of the complete list of structures included in the international anatomical nomenclature[8], the general practitioners involved had to select those elements which they considered to be indispensable for their everyday practice.

Results

The international anatomical nomenclature includes 204 terms under the cranial nerves. Out of these, 196

were assessed unanimously in the present study: 14 were considered to be relevant by all practitioners questioned and 182 by none of them. This corresponds to a *consensus gentium* in 96,1% of cases. 8 items (3,9%) gave rise to disagreement: 3 of them were selected by six of the participants, 2 by four, 2 by two and 1 by one. Taking into account those items which were considered to be essential by at least two members of the sample, 21 entries (10,3%) were finally ascertained to be indispensable for general practice. They will be reviewed in the following discussion and tables.

Discussion

The first striking fact to emerge from this investigation is the near unanimity between the opinions offered, which included 96,1% of the items. This confirms for the cranial nerves what had already emerged from the previous studies, where agreement amounted to between 87,1% and 94,5%. In contrast to the opinions occasionally expressed by both morphologists and clinicians - that there is no general basic anatomy - it appears that a uniform need for gross anatomy within the field of general medical practice really does exist.

A second noteworthy result is the small quota of items considered that was ascertained to be relevant to general medical practice (namely 10,3% of the structures mentioned by the international anatomical nomenclature in connection with the cranial nerves). This score is also in accordance with that of the other chapters investigated so far, namely 33.4% for osteology, 32,6% for the female reproductive organs, 27,9% for arthrology (including 17,1% for the synovial bursae), 13,2% for the arteries and 13,1% for the ear. A probably general tendency thus becomes apparent which would make a reduction in the amount of information taught possible, without endangering, nay even improving, the basic knowledge necessary for clinical practice.

In addition to these two quantitative assessments, there was a third, qualitative evaluation which should be mentioned. Those questioned were unanimous in emphasising that it is not the morphological knowledge that is required for general medical practice, but that of the functions observed during the clinical examination of the patient. This predominance of function over anatomy has already been established for other systems.[7] However, in the case of the cranial nerves it is particularly marked, probably because anatomical diagnosis and treatment were clearly considered to be the concern of the specialist (particularly the neuroradiologist and neurosurgeon). For this reason, a selection was made of those functions which are accessible to testing by the general medical practitioner. In Tables 1 and 2, the functions of the cranial nerves which are usually taught have been compared with those selected.

As discussed in the report on the endocrine system[9], several investigations suggest that the clinical diagnoses made by general practitioners differ astonishingly little from country to country. It seems therefore allowed to suppose that the results mentionned in this study could be applicable to other regions than Western Europe. Thus, the author, who is planning to extend the investigation to the whole area of systematic anatomy, hopes to make a general contribution to the development of a medical curriculum which shall be specifically directed toward the needs of physicians providing primary care.

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Correspondence to:

J.H.D. Fasel, M.D.,
Department of Morphology, University Medical Center,
1 Rue Michel-Servet,
CH-1211 Geneva,
Switzerland.
Telephone number ...4122 / 702 53 18,
Fax number ...4122 / 347 33 34