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Terminology and Professionalism in Technologized Medicine

Abstract: For a practical science like medicine, which not only wants to recognize, represent, and interpret but also has to make practical decisions, the reliability of language is at least as important as its professionalism. Medical terminology is the connecting link between scientific propositions, probabilities, standards of action, cost-benefit analyses, and the patients' assessment. Not rarely, the professionalism of medical statements cannot obscure potential deficiencies in their application and implementation. The vocabulary of the apparatus technology determines the further development of medical terminology. In the technocratic idiom of physicians, neither is the primacy of English problematic nor the Greco-Latin heritage called into question.

At first glance, the linguistic format does not play a very important role in medical science, given the conglomerate of genuinely medical, social, ethical, organizational, and economic aspects that influence medical decision-making and action. Thus, until recently, terminology was not a topic of particular interest to practitioners in the field. For a long time, medical and dental students had come to universities with applicable knowledge of Greek and/or Latin and had acquired the *lingua medicinalis* in parallel with the *materia medica* without complaint. It was not until the loss of familiarity with the ancient languages and the introduction of targeted instruction in the acquisition of medical vocabulary in the 1970s that terminology became a distinct, though not independent, branch of knowledge. The associated prospect and hope that it might develop, at least to some extent, into something like a specialized linguistics have remained unfulfilled. The course in terminology has remained the preschool of medical studies to this day. The lessons have been transferred to the institutes for the history and ethics of medicine, where they are generally taught by younger research assistants and endured by the students with their eyes firmly fixed on the final semester paper – a true academic duty for all concerned. This training has hardly anything to do with linguistics in the classical sense. There are, however, some lecturers who present other sources of medical vocabulary to some extent, such as Arabic, the folkloric vocabulary, the many proper names, and the Anglo-Saxon and French reservoir of terms. The textbooks and workbooks of the subject are predominantly pure vocabulary volumes, garnished with sprinkles of grammar and etymology. It is a little-loved subject and, moreover, one without any externally recognizable research activity, although the transfer of medical knowledge via technical language has always had a significant influence on the success

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of its dissemination and implementation in daily practice, and would have justified the subsequent development of a philology of medicine, however shaped. In this context, the classical philologists must retrospectively allow themselves to be asked why they did not become active themselves in the past and agree to take over the teaching. They would have been in good company. The physicists, chemists, and biologists have been giving lessons to the first-year medical students for decades without complaint, even if it is purely propaedeutics. The philologists could have done the same – not to their disadvantage. Incidentally, it would have been a kind of homage to the great ancient medical writers and originators of classical medical terminology. Nowhere are two dead languages so alive side by side as in medicine; nowhere are Greek and Latin vocabularies so well preserved and at the same time so amenable to innovation as in medical terminology; nowhere do they also coexist so harmoniously as in medicine; and nowhere are they used so naturally in the service of a ubiquitous science as in medicine.

1 Examples from Practice

The analysis of doctors' letters, instructions for use, information sheets, reports of findings, as well as general and scientific publications provides access to an understanding of the relationship between terminology and professionalism in engineered medicine.

1.1 Physician's Letter I

The document (Fig. 1) is an excerpt from a doctor's letter from a hospital department for cardiology and hypertensiology, in which utmost importance is placed on conciseness of the message, restricting it to the essentials without the text being overloaded with technical terms. There is only one term that is not yet in all medical dictionaries, namely that of *renal denervation*, a new form of minimally invasive treatment of hypertension that is currently undergoing clinical trials and has recently been considerably discredited by a qualified comparative study.

The first sentence of the current medical history sounds like a semi-official pronouncement of the physician's therapeutic intention with an impressive escalation in tone toward the end of the line. The prior medical history is very succinct and only partially relevant to the planned procedure.

APAP is used to abbreviate a form of conservative treatment for sleep apnoea syndrome in which the therapeutic ventilative pressure required for each breath is determined and adjusted to the changing needs of the patient, namely 'A' for 'Automatic', 'P' for 'Positive', 'A' for 'Airway', and 'P' for 'Pressure'.

The second paragraph lists the five antihypertensive drugs the patient is taking, namely *Ramipril*^{R}, an angiotensin-converting enzyme inhibitor, or ACE inhibitor; hydro-

ARZTBRIEF I (Auszug)
Männlicher Patient (Jahrgang 1953)

Aktuelle Anamnese

Die stationäre Aufnahme erfolgte zur Einstellung einer therapierefraktären arteriellen Hypertonie unter antihypertensiver 5fach-Medikation mittels renaler Denervierung. Bei Aufnahme war Herr . . . beschwerdefrei. Akute klinische Infektzeichen wurden auf Nachfrage verneint. Eine pulmologische Kontrolle der APAP-Therapie war unauffällig.

Häusliche Medikamente

Ramipril/HCT 5/25 mg 1-0-0
Ramipril 5 mg 1-0-0
Moxonidin 0.4 mg 1-0-0
Carmen 20 mg 1-0-0
Metoprolol 95 mg 1-0-1

Untersuchungsbefund

RR 155/85 mm Hg, HF: 60/min, guter Allgemein-und normaler Ernährungszustand. Keine Dyspnoe, keine Zyanose. Mäßige Beinödeme beidseits. Haut und Schleimhäute feucht. Lunge, Herz und Abdomen unauffällig. Peripherer Pulsstatus unauffällig. Patient wach, adäquat reagierend und orientiert. Kein fokalneurologisches Defizit.

Fig. 1: Physician's letter I (Dr. E.M., Hamburg 12.11.2012, excerpt (author's archive)).

chlorothiazide, a saluretic; *Moxonidin*^{R}, an α2-receptor agonist and vasodilator; Carmen^{R}; *lercanidipine*, a calcium channel blocker; and *metoprolol*, a β-receptor blocker.

Except for Carmen^{R}, a trade name with an unmistakably classical root, these are abbreviated names of active chemical ingredients. This means that the substances have been approved and on the market for at least 10 years because otherwise the corresponding generics would not exist, and that the physician has prescribed the generic rather than the original preparations because the former are generally cheaper.

It would be a delightful task for the medical historian to systematically examine the names of drugs in the various modern languages for their ancient elements and to compare them with the terminology of chemists and pharmacologists.

The report on the physical examination of the admitted patient is brief, and the diction indicates that the physician merely wants to fulfill his documentation obligation. In any case, the standard of care for specialists is not met. In the case of a patient suffering from excessively high blood pressure, one does not give only one reading, but one measures at least on both arms and, if possible, also on the legs. 'RR', the abbreviation for systolic and diastolic blood pressure, is derived from the double name Riva-Rocci. Scipione Riva-Rocci, a paediatrician from Pavia, invented the apparatus for the mechanical measurement of blood pressure, which is in principle still used today, and published the method in 1896 when he was 33 years old. However, the abbreviation 'RR' is only used in German-speaking countries. Not even the Italians have adopted it.

Among the other physical findings that were gathered and described, only one is pathological, namely the condition of the legs. They are described as swollen. With such a finding, one must additionally document at least the status of the lymph nodes and veins in order to gain clarification of the pathogenesis of the edema. This addition was criminally missed by the examiner. Likewise, the last statement made (*kein fokal-neurologischer Befund*, no focal neurological findings) indicates that the physician neurologically examined the patient superficially at best. To the initiated, it is recognizably a set phrase.

Today, trainee physicians are generally advised to present the prior medical history in the language of the patient, for example, "The patient says he/she coughed up blood" and not "The patient reports hemoptysis." Only in the epicrisis are the appropriate technical terms then used. In this way, the physician presents himself both as an attentive listener and capable interpreter, then finally as a diagnostic analyst.

The legitimacy of the use of technical language thus varies depending on the level of observation and the addressee of the letter. If the physician's letter is addressed directly or in CC to the patient, one might adapt the choice of technical terms to the expectations of the recipient(s) in order to avoid misunderstandings or to soften the delivery of a shocking message. Conversely, the gap between the so-called experts and the so-called laypersons in the terminological sector can paradoxically flatten out or even be reversed if, for example, a person who has been ill for many years reports on his or her fate to the representative of a specialty that is otherwise not or hardly concerned with the ailment, for example, a chronic diabetic to an ENT specialist.

1.2 Physician's Letter II

The information in the table (Fig. 2) represents an excerpt from a report of an oncology department in which the diagnosis and therapeutic measures are listed in chronological order for a tumor patient who has been treated closely and intensively over a long period of time. If one were to measure the professionalism of a medical communication solely by the density of technical terms, this catalogue would deserve the highest ranking. If one disregards the linking words and banal abbreviations (ED: *Erstdiagnose*, initial diagnosis, AZ: *Allgemeinzustand*, general condition, Z. n.: *Zustand nach*, condition after), about two thirds of the vocabulary are technical terms of Greek and Latin origin wrapped in a German-language cloak. The text memorably depicts the severity of the disease (metastatic bronchial carcinoma), the intensity of treatment (surgery, radiation, chemotherapy, local interventions), and the drama of the course. The abbreviation pT3 pN0 cM0 G3 stands for the so-called tumor formula according to the TNM system, and the abbreviation HAART stands for the HochAktive AntiRetrovirale Therapie (HAART), which is commonly used today in HIV treatment.

The text also contains several lapses, such as in the first sentence the unfortunate tautology of *Filiae* and *metastasiert*, in the second sentence the pleonasm *transarteriell* – *arteriell* alone would suffice – and in the last sentence the missing organ

ARZTBRIEF II (Auszug)
Männlicher Patient (Jahrgang 1945)

DIAGNOSEN

- Hepatische Filiae eines metastasierten differenzierten Plattenepithelkarzinoms des linken Lungenoberlappens (ED: 04/12 – pT3 pN0 cM0 G3)
- Z. n. Thorakotomie mit Tumorexstirpation sowie Oberlappenresektion und Lymphonodektomie 05/12
- Z. n. siebenmaliger transarterieller Chemoembolisation/-perfusion, zuletzt am 24.09.13
- Z. n. Radiochemotherapie mit 50.0 Gray in Kombination mit Vinorelbin^{R} oral 08/12 (Therapieabbruch bei AZ-Verschlechterung)
- Z. n. systemischer Chemotherapie mit Gemcitabine 11-12-/12
- HIV-Infektion unter HAART-Therapie 1986
- Z. n. zweimaliger Mikrowellenablation, zuletzt am 29.08.13

Fig. 2: Physician's letter II (Prof. Dr. V.N., Frankfurt/Main 25.02.2013, excerpt (author's archive)).

denotation. From the overall context, however, only microwave ablation of liver parenchyma can be meant. The author has also avoided, despite an obvious inclination for technically differentiated expression, naming the location of the primary tumor, namely the lung, in Latin. He artlessly refers to the left upper lobe of the lung rather than the *Lobus superior pulmonis sinistri*.

2 Rote Liste 2013

This excerpt from an entry in the so-called *Rote Liste* (Fig. 3), the official drug directory for Germany, refers to the lipid-lowering drug *Fluvastatin*, an inhibitor of cholesterol synthesis marketed under the name Locol^{R}, among others. The same text is also found under the heading *Nebenwirkungen* (side-effects) in the package insert, so it is expressly intended to be read by patients and should accordingly be both professionally designed and suitable for an intellectually broad readership. Yet, it is anything but. In the incidence rates of the respective side effects, a distinction is made only between 'frequent', 'rare', and 'very rare'; percentages are not given. This is a serious deficiency. In general, 'frequently' means 1–5%, 'rarely' means less than 1%, and 'very rarely' means less than 0.1%. But these rates must be explicitly stated.

The choice of the term *urticaria* for the only adverse reaction classified as rare is unfortunate and can only be described as a stopgap measure since *urticaria* stands for several dozen different allergic diseases in the broadest sense, ranging from a simple rash to threatening laryngeal edema.

Among the very rare adverse effects, symptoms (e.g., hypesthesia) and closed nosologic entities (e.g., peripheral neuropathy) are listed all at once with no apparent weighting. This is a deficiency in content, not terminology. For most readers, however, the deterrent potential of the paragraph is likely to be more significant than the informational content of the enumeration.

ROTE LISTE 2013
Locol^{R} 80 mg Retardtabletten
(Wirkstoff: Fluvastatin)

NEBENWIRKUNGEN

Häufig: Schwindel, Gelenkschmerzen

Selten: Urtikaria

Sehr selten: Parästhesie, Dysästhesie, Hypästhesie, periphere Neuropathie, Hauterscheinungen (z. B. Ekzeme, Dermatitis, bullöse Exantheme), Lupus-erythematodes-ähnliches Syndrom, Thrombozytopenie, Angioödem, Fazialödem, Vaskulitiden, Myositis, Rhabdomyolyse, reversible Hepatitis, akute Pankreatitis

Gelegentlich mäßige Anstiege der Serumtransaminasen (weniger als das 3fache der oberen Normgrenze). Bei weniger als 1% der Pat. Anstiege der Serumtransaminasen auf mehr als das 3fache der oberen Normgrenze. Nach Absetzen von Fluvastatin in den meisten Fällen reversibel. Deutliche Anstiege der CK-Werte auf mehr als das 5fache der oberen Normgrenze bei einer sehr geringen Anzahl der Pat. (0.3 bis 1.0%).

Fig. 3: Rote Liste 2013. Arzneimittelverzeichnis für Deutschland (einschließlich EU-Zulassungen und bestimmter Medizinprodukte). Verlag Rote Liste^{R} Service GmbH, Frankfurt/Main, 2013.

In the appendix, laboratory changes are discussed in relative detail and the names of enzymes (namely serum transaminases and CK = creatine kinase) are mentioned whose pathophysiological background is generally unknown to the layman. At most, one person or another will correctly assume that it is the so-called liver function readings behind the serum transaminases and associate the creatine kinase with the heart muscle. On the whole, however, the described deviations from the norm are only an expression of a hepatotoxic or myotoxic effect of the substance fluvastatin and thus merely laboratory signs of the hepatitis and myositis mentioned in the previous paragraph.

At least the presentation is clear and honest and does not try to weaken or disguise unpleasant facts by clever choice of words. Many other package inserts, on the other hand, are veritable treasure troves of rabble-rousing, for example, when they speak of the connection between cause X and effect Y: “X may occasionally lead to Y,” or “X may in exceptional cases lead to Y.”

3 Documented Patient Information

This document (Fig. 4) contains an excerpt from the basic information for patients who are advised to have a feeding tube inserted through the abdominal wall into the stomach or small intestine, that is, *percutaneous gastro- or intestinostomy*. The entire text is 3½ pages long and includes several schematic illustrations. It is given to patients to read before the pre-operative discussion. Such written instructions about interventions which come with the possibility of severe consequences and complications can be expected to be patient- and situation-oriented and formulated in colloquial language as much as possible.

DOKUMENTIERTE PATIENTENAUFKLÄRUNG

Basisinformation zum Aufklärungsgespräch über:
Einlegen einer Ernährungssonde durch die Bauchwand
in den Magen/Dünndarm

Sehr geehrte Patientin, Sehr geehrter Patient,

bei Ihnen ist die natürliche Nahrungs-/Flüssigkeitszufuhr nicht oder nur zum Teil möglich. Das Einlegen einer Ernährungssonde durch die Bauchwand ermöglicht Ihnen eine ausreichende Ernährung mit allen wichtigen Nährstoffen, Vitaminen und Mineralien.

Der Arzt empfiehlt Ihnen folgende Technik:

Fadendurchzugsmethode

Nach örtlicher Betäubung punktiert der Arzt von außen mit einer Nadel unter endoskopischer Kontrolle die Bauch- und Magenwand.

Durch die Punktionsnadel schiebt der Arzt zunächst einen Faden von außen in den Magen oder Dünndarm vor. Mit einer kleinen über das Endoskop eingeführten Zange wird der Faden von innen gefasst und zusammen mit dem Endoskop über die Speiseröhre und den Mund nach außen gezogen. Die Sonde wird nun an dem aus der Bauchwand herausragenden Fadenende in den Verdauungstrakt geführt und dort verankert.

Fig. 4: Documented patient education (ed. Thieme Compliance GmbH, 91068 Erlangen).

This communication largely meets this requirement. It is factual, professionally arranged, and yet largely manages without technical terms. *Endoskop* (endoscope) and *Punktionsnadel* (puncture needle) are the only two exceptions. The precision of the text does not suffer from this, even if it is poor stylistic choice. The authors also leave no doubt about the seriousness of the situation when they state that nutrition by natural means is not possible or only possible to an insufficient extent for the patient, and they seem to be convinced of the method they propose because possible alternatives – open surgical intervention or parenteral nutrition – are only mentioned on the last page and even then only briefly.

3.1 Conventional X-ray Examination of the Thoracic Organs

Imaging of the thorax is by far the most common radiologic examination. For admission to specialist examination in diagnostic radiology, the assessment of at least 6000 overview images of the heart and lungs must be demonstrated. Despite this massive sum, the examination does not have a uniform name. One says *Thorax p.a.* (p.a. = *postero-anterior*) or *Thorax d.v.* (d.v. = *dorso-ventral*) or *Röntgen-Thorax* (X-ray thorax) or *Rö-Thorax* (abb. X-ray thorax) or also *Herzfernaufnahme* (remote cardiac radiograph). However, the latter designation certainly does not correspond to the facts because

one sees not only the heart, but also the lungs and the bones and soft tissues of the thoracic wall. Of course, the X-ray does not show the heart itself, but its shadow – the shadow of the heart. This is why we speak of shadows on the lungs when solid lesions appear in the otherwise normally ventilated lung parenchyma. Even if the radiograph is without pathologic findings, the constituent anatomic elements are mentioned and briefly characterized in the descriptive portion of the report. In the assessment, the referring physician's question is answered as precisely as possible (Fig. 5).

KONVENTIONELLE RÖNTGENUNTERSUCHUNG DER THORAXORGANE IM P.A. STRAHLENGANG
NORMALBEFUND (Beispiel)

INDIKATION
Ausschluss einer frischen spezifischen Infektion. Sonstige krankhafte Befunde?

BEFUND
Beide Zwerchfelle normal hoch, glatt und scharf begrenzt. Beide Zwerchfellrippenwinkel spitz.
Herzschatten normal groß, regelrecht konfiguriert. Aortenschatten normal lang, normal breit und normal dicht. Lungenwurzeln und Lungengefäßzeichnung regelrecht. Kein Nachweis knotiger / flächenhafter Verschattungen des Lungenparenchyms. Kein Nachweis umschriebener / diffuser Verdichtungen oder Verkalkungen der Pleura und der Weichteile des Thorax
Kein Nachweis von Läsionen des Thoraxskeletts
Keine metalldichten Fremdkörper

BEURTEILUNG
An Herz und Lungen kein krankhafter Befund, insbesondere kein Nachweis einer frischen spezifischen Infektion, einer Lungenstauung, eines Ergusses oder einer bronchopulmonalen Neubildung.

Unterschrift des Arztes

Fig. 5: Findings report (Dr. A.A., Munich 22.12.2012, author's archive).

The creative performance of the radiologist is measured by the written report of findings, but the quality of the communication is not measured exclusively by the accuracy of the diagnostic statement. Not every communication that contains the correct diagnosis is equally valuable to the client. One and the same finding may be formulated in different ways. Many habitual and accidental factors influence what is said and what is not said, or what is evaluated and how, and what remains unevaluated. The addressee has a fine sense for such variations. Even subtle nuances of wording can influence the appreciation for the report and the recipient's reaction to the outcome of the investigation. The less certain a diagnosis is and the less predictable its potential consequences, the more nuances and paraphrases can be expected in the report. The decision about the nature and extent of the text is not made at the moment of dictation, but is influenced by knowledge of the patient's history and symptoms, clinical examination of the patient, and personal contact with them or their relatives, as well as by a number of circumstances in the viewing of the images. The

investigators translate their professional knowledge and observations into the diagnostic message in different intra- and inter-individual ways. The subjective component of information transfer in diagnostic imaging explains not only the differences in the scope and depth of diagnosis and differential diagnosis but also the range and depth of variance of further diagnostic and therapeutic recommendations.

4 Medical Journalism

A bridge between the continuous professional use of the terms of medicine and medical technology by physicians and their occasional use by laypersons is provided by medical journalism. The reading of paraphrases of academic publications helps the patient, beyond a general acquisition of new knowledge, to better understanding and more skillful expression in dealing with medical personnel. Even Galen of Pergamum demanded basic medical knowledge from the sick so that they could converse with him with at least a rudimentary degree of professional competence.[1] The following excerpt from an article in the *Wissen* (Knowledge) section of the *Süddeutsche Zeitung* of January 29, 2014 (Fig. 6), deals with advances in the production of stem cells. The method described is quite controversial, even though the study in which it is described was published in *Nature*, the natural science journal with the highest impact factor.

MEDIZINJOURNALISMUS

Süddeutsche Zeitung
Ressort: Wissen (30.01.14) – Autorin: Katrin Blawat

SCHNELL UND EINFACH
STAMMZELLEN LASSEN SICH MIT ZITRONENSÄURE HERSTELLEN

Sogenannte pluripotente Stammzellen lassen sich mithilfe einer sauren Lösung herstellen. . .Um sie herzustellen, verändert man bisher ihr Erbgut oder setzt verschiedene Proteine ein. Zumindest bei Mauszellen funktioniert aber auch eine simplere Methode, die Forscher um *Haruko Obakata* von der Harvard Medical School in Boston vorstellen (*Nature, Bd. 505, S. 641 und 676, 2014).*

Sie setzten Blutzellen aus neugeborenen Mäusen einer Zitronensäure-Lösung mit einem pH-Wert zwischen 5,4 und 5,8 aus. Ein kleiner Teil der behandelten Zellen änderte daraufhin seine Identität. Die ehemaligen Leukozyten wurden zu Zellen, die sich zu allen möglichen Gewebetypen entwickeln konnten . . .

Gibt man zu diesen Zellen ein spezifisches Medium, können sich die Zellen immer wieder fortpflanzen, wie es für Stammzellen charakteristisch ist.

Fig. 6: Medical journalism (K. Blawat, Süddeutsche Zeitung 30.01.2014).

1 *On the Composition of Drugs according to Places* II 1 (Kühn 12.545).

The author first uses the term *Stammzellen* (stem cells) as if knowledge of them were self-evident, but then reflects on her educational mission and explains at the end that the characteristic of stem cells is that they reproduce again and again. In the middle part of the article, terms from medicine (protein, leukocytes) and chemistry (pH value, citric acid) are also used sparingly so that reading is not too difficult. However, behind the terminological restraint lie the danger of trivialization and the risk of conveying knowledge in a way that is not appropriate to the subject. The choice of the right vocabulary is therefore also a political issue in medical publications written by and for the layperson. Stem cells, which are elevated to the status of panacea by modern medicine, cannot be produced as 'quickly and easily' as announced in the headline.

5 Advanced Training Essay

From the Erlangen-based science-theorist Helmut Seiffert comes the statement (1973, 86):

> Wenn ein Arzt etwa von einer 'Fraktur der Patella' oder einer 'otitis media' spricht, so kann sich das jeder, der Latein und Griechisch gelernt hat, in 'Bruch der Kniescheibe' und 'Mittelohrentzündung' übersetzen, ohne dass sich damit am Sachverhalt irgend etwas ändert.

This remark, of course, hardly catches on with the authors of scientific texts. In any case, in the educational article on the complications of liver cirrhosis written by Tilman Sauerbruch, Emeritus Professor of Gastroenterology at the University of Bonn, and colleagues for the *Deutsches Ärzteblatt*, there is an extraordinary concentration of technical terms from all the fields involved (*anatomy: portosystemic shunts, physiology: formation of reactive oxygen and nitric oxide radicals, pathology: astrocyte swelling*).

Nevertheless, the presentation is reasonably easy to understand even on first reading, although this is mainly because it is textbook knowledge for a revision course rather than a research paper. The terms are always used in the right place, none too much – it is expressly called intestine and not intestinum – but also none too little – for the pathophysiology of hepatic encephalopathy it is actually endogenous neurotoxins which are responsible and not externally supplied nerve toxins. The reference to ammonia being only a surrogate marker should be taken as an additional indication that this is a professional presentation. In a less serious text, one would have rather tried to distract from this aporia.

6 Original Article: Clinical Research

In 2012, the journal *Spine* published an original paper comparing open spine surgery with so-called minimally invasive spine surgery from the standpoints of cost-effectiveness and clinical rehabilitation success. The section dealing with surgical technique in the nar-

FORTBILDUNGSAUFSATZ

Konservative und interventionelle Therapie
der Komplikationen bei Leberzirrhose

Sauerbruch T, Appenrodt B, Schmitz V, Spengler U

Die hepatische Enzephalopathie (HE) entsteht über portosystemische Shunts bei reduzierter hepatischer Entgiftung des Portalvenenbluts von neurotoxischen Substanzen aus dem Darm, die im Zusammenspiel mit Ammoniak neurochemische Veränderungen bewirken.

Neben einer Astrozytenschwellung und gesteigerter Bildung reaktiver Sauerstoff- und Stickoxidradikale, die dann Proteine und RNA in der Zelle verändern (20), sind auch zentralnervöse Entzündungsprozesse bedeutsam (e17).

Die beteiligten Neurotoxine und Entzündungsmediatoren sowie die Rolle der intestinalen Bakterienflora sind nur unvollständig verstanden. Ammoniak stellt den wichtigsten Surrogatmarker der HE im Blut dar. Allerdings korrelieren die Blutammoniakspiegel nur schlecht mit den gestörten psychomotorischen Funktionen.

Fig. 7: Further education essay (Deutsches Ärzteblatt 110.8 (22.02.2013), S. 126–132).

ORIGINAL ARTICLE – CLINICAL RESEARCH

A Comparison of Perioperative Costs and Outcomes in Patients
With and Without Worker`s Compensation Claims Treated With
Minimally Invasive or Open Transforaminal Lumbar Interbody Fusion

Pelton M A, Phillips F M, Singh K:

Surgical technique

With the open TLIF (transforaminal lumbar interbody fusion) procedure, a midline incision followed by subperiosteal muscular dissection to the facet joints bilaterally was undertaken. A unilateral facetectomy was performed followed by a single intervertebral cage and bilateral pedicle screw fixation. Bilateral neural decompression was also performed. For the minimally invasive TLIF procedure, a unilateral approach was undertaken through a paramedian skin incision using the WILTSE technique under fluoroscopy. Unilateral pedicle screws were placed percutaneously over a guide wire. The laminectomy, bilateral decompression, and TLIF were performed *via* a 21-mm nonexpandable tube. Midline muscular and ligamentous structures were all preserved during the procedure.

Fig. 8: Original article: clinical research (Spine 2012.37: 1914–1919).

rower sense (Figs. 7–8) impressively demonstrates the universality and timelessness of the Greco-Latin thesaurus of medical terms, and above all their flexibility when it comes to correctly describing and designating novel interventions.

First, six classical surgical techniques are mentioned, namely decompression, dissection, facetectomy, fixation, incision, and laminectomy. In all six cases, the ancient vocabulary has long served well in the naming of the techniques. And it is also – almost – sufficient for the designation of the recently developed *TLIF* (Transforaminal Lumbar Interbody Fusion). Again, only Latin nouns, adjectives and prepositions are found – with one exception: The fusion is characterized here as *interbody* (body from Old English *bodig* 'trunk, stem') and not as *intercorporal* as usual. The ancient vocabulary is thus also needed in distinctly technology-oriented medical texts and is successfully used with surprisingly little modification and little blending.

7 Terminology and Reliability

For a practical science like medicine, which not only wants to recognize, represent, and interpret, but also has to change and shape, the reliability of language is at least as important as its professionalism. Reliability of a statement means the evidential demonstration of the findings, but not conclusions in the sense of setting norms, only the proof of the facts in adequate language. The statements are not an end in themselves but have functional significance within contexts of medical treatment. Medical action cannot be justified by reference to theoretical knowledge alone. Nevertheless, both general and specific propositions of theoretical sciences are interwoven in the legitimization and thereby assume functions otherwise alien to them. Terminology, then, is the point of interchange between scientific propositions, probabilities, consequences that cannot be definitively verified, and standards of action whose reliability is modified by a greater or lesser probability of error, the cost-benefit ratio, and the patient's evaluation.

8 Terminology and External Effect

It is possible to speak in general language about a specialty without embarrassing oneself. Sometimes this method is both a more challenging one and the better choice. One should assume that an expert group, for all its scientism, is interested in isolating itself as little as possible linguistically in order to be heard and understood outside its own territory. A linguistic structure that serves the purpose of communication within a group and strengthens its cohesion should not become a burden, nor should it discriminate against those who use it by revealing their membership in a particular group or stratum through its use. Moreover, the greater the external impact of the discipline, the more attempts will be made to appropriate its language, albeit perhaps in a plainer form. In addition, although the philological aspect of medicine is less pronounced than the cognitive one, there is nevertheless a universal call for the promo-

tion of so-called speaking medicine, although this does not refer to the appropriation and use of technical language.

In scientific medicine, the methodically assured assignment of symptoms and findings to a nosological entity is mandatory. The terms used for this purpose are indispensable as pragmatic abbreviations, central means of communication, classificatory terms for teaching, learning and research, and as instruments for information processing, statistics, and documentation. In medical practice, on the other hand, scientific diagnoses do not correspond to the multidimensionality of the disease, nor to the reality of the life of the sick person, nor can every examination result be necessarily associated with a fixed concept of disease. Every result of scientific research in medicine is afflicted with the systematic error of unpredictability in its implementation and individual practical application.

9 Terminology and Situational Justice

At least as important as conceptual criteria and their scientific reliability are situational justice and operational characteristics, above all the restriction of the medical statement to the respective context of meaning. The formulation may vary depending on whether the diagnosis/suspected diagnosis or prognosis is intended to justify therapeutic action per se, hospitalization, a social assistance measure, or an insurance claim, or whether it is intended to change the patient's behavior or influence his or her role in school, family, or the workplace. Any of these uses can limit the validity of a diagnosis without changing the underlying scientific claims. The main reason for the lack of stringency in diagnostic labels is that there are no universally accepted criteria for distinguishing between health to be experienced and illness to be suffered. In many cases this also results in the uncertainty as to whether decision-making and action are mandatory – no matter how hard one may try in the interest of the patient: the uncertainty of diagnostic and prognostic statements cannot always be eliminated by a structured, terminologically incontestable norm-finding process. Even in individual cases, the scientific nature of the statement cannot hide potential deficiencies in obtaining and applying it. From the point of view of the person concerned, the individual course of events can prove the current state of understanding to be wrong, no matter how aptly it is formulated. In the reality of the patient's life, the problems of understanding are overlaid by the emotional pressure of suffering, behind which lurk infirmity and death. The more the sick person is frightened by this, the less rationally she can inwardly process the information offered, the less her decision arises from unrestricted self-disposal. The irrationality of illness and the absurdity of death relativize not only medical progress but also the authority of medical statements. Not infrequently, therefore, the doctor-patient conversation fails in its mandate to recognize, formulate, and enforce reality – despite all the terminological disciplining that therapists strive to do.

10 Terminology and Conversation

The vertical stratification of the level of expertise within which the medical professional communicates, that is, the ladder of steps from the first contact with the patient, through the doctor's letter or an expert opinion, to the scientific publication in the native language or another language, has led to some accusations against doctors, which, from a sociocultural perspective, is understandable. Some are worth serious consideration, others less so. Among the latter is certainly the reproach that the technical language is sometimes used by those working in medicine to distinguish themselves and to give the appearance of special erudition. Whenever a physician tries to impress a patient once or severally with her choice of words and thereby limits the possibility of conversational involvement from the one seeking advice and assistance, the patient is perfectly within her rights to point out this error and ask for a reduction of the technical language in the conversation. If necessary, she can also inquire elsewhere for a description and explanation of the factual context which bears both the necessary precision as well as an adapted choice of words. On the other hand, it is serious when the physician, as an interpreter of what her colleagues and she herself have done and still want to do, uses the linguistic advantage to conceal uncertainty and to look for excuses, that is, when she turns the instrument of the intellect into a tool of encoding or concealment. One exposes oneself to this danger, for example, when such indefinite terms as atrophy, degeneration, infiltration, organopathy, and the proper name constructions from the arsenal of syndrome theory are used, although one could select much more precise terms from the thesaurus of technical language that are better suited to the individual situation. An expert is not someone who has just acquired a special competence, but someone who is also verbally able to make it clear that she has it.

11 Terminology and Stylistics

All cultures have introduced knowledge and linguistic elements into the medical system of thought. The fact that Greek and Latin still dominate today is due to the fact that they shaped the fundamental sciences, especially anatomy, and were common as educational languages for a long time. In today's medicine, changes and innovations in language are determined by the progress of technology and imported from neighboring sciences, sometimes even imposed by them. The progress of medicine is a technical-mechanical one, and the development of the language that goes with it is a borrowing from the engineering sciences and not medicine's own contribution. The vocabulary of the manufacturers determines the terminology of apparatus medicine and thus shapes the technocratic vocabulary of the physicians. One would not speak of robotic surgery if there were no robots, one would not speak of laser keratoplasty

if there were no laser devices, and one would not speak of monoclonal antibodies if the biotechnical industry did not offer the laboratories the corresponding apparatus equipment for their production. The so-called auxiliary sciences of medicine also provide the tools for the accompanying linguistic progress in the form of innovative hardware and software. This changes the relation between the genuinely medical and the interdisciplinary terms. In medicine, which has been technologized in this way, neither is the primacy of English problematized nor is the Greek-Latin heritage called into question. Nor is it a matter of the beauty of the terms, but solely of their appropriateness and unambiguity. In medicine, the aesthetics of language play at best a secondary role to the content and novelty of the message. Even for peer-review decisions in medical journals, questions of style are of marginal importance at best.

12 Terminology and Viability

According to the theory, the language of science in medicine should help to communicate and consolidate constructs and thus ensure quality. Thus, it should be a sympathetic tool. In practice, however, it has increasingly become an advertising medium because by introducing, adopting, and developing the words and names provided by industry, the physician makes herself its mouthpiece and thus its agent in the vast market of new machines and drugs. The combination of terminology and professionalism has degenerated through the mechanization of medicine into a liaison of new word creations and profit-oriented presentation.

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