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Clinical practice guidelines in courts' representation of medical evidence and testimony

Jaakko Taipale [a,*], Lotta Hautamäki [b]

[a] University of Helsinki, Finland
[b] Tampere University, Finland

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ABSTRACT

This article examines clinical practice guidelines (CPG) in the courtroom. The guidelines in question are Finnish national current care guidelines for brain injuries, and the case context is traffic insurance compensation cases contested in the Helsinki district court. We analyse 11 case verdicts qualitatively, drawing from earlier sociological and theoretical accounts of clinical practice guidelines and evidence-based medicine. What makes the case-type relevant for studying clinical practice guidelines is the fact that the cases, which feature a medical dispute concerning traumatic brain injury, involve highly specialized expertise and contradictory expert claims, but the cases are decided in a generalist court by non-expert judges. What we show in the article is how the guidelines structure, sequence and initiate temporal reworking in the judges' representation of medical evidence and testimony, and how the plaintiffs' delayed diagnoses complicate the application of the CPG in the evaluation. We further discuss the guidelines' epistemic authority in the verdicts and finish by comparing the 2008 and 2017 editions of Finnish CPGs for brain injuries, suggesting a multifaceted, courtroom-mediated feedback loop between the patient-plaintiffs and the clinical practice guidelines.

Credit author statement

Taipale: Conceptualization, Methodology, Investigation, Resources, Writing – original draft, Writing – review & editing, Hautamäki: Conceptualization, Writing – original draft

1. Brain trauma and clinical practice guidelines in the helsinki district court

Clinical practice guidelines (CPG) are a hallmark of evidence-based medicine (EBM) and the related health care standardization movement in the late 20th century. EBM seeks to set research evidence as the basis for clinical decision making and to de-emphasize clinical experience and intuition (Knaapen, 2014; Lambert, 2006; Sackett et al., 2000; Timmermans and Berg, 2003; Tonelli, 1998). Such preference is motivated by perceived improvements in the efficacy and safety of diagnostic procedures and treatment interventions in clinical care, a result of bringing 'order and coherence to a rapidly expanding and heterogeneous medical domain' (Weisz et al., 2007: 692). It is in this sense that we examine CPGs as guidelines that indicate proper medical practice. However, our interest lies not in what the guidelines indicate in the clinic for the medical practitioner, but rather what they indicate in the courtroom for legal professionals.

The use of CPGs is a widespread tool in health care research and practice, from biomedicine to nursing (Weisz et al., 2007). EBM, the paradigm behind the development and dissemination of CPGs, works by ranking medical knowledge into different levels of evidence. Randomized clinical trials (RCTs) and systematic reviews are considered most reliable and relevant, while case studies based on clinical experience, case reports and individual expert opinion occupy the opposite end of the spectrum (Cartwright, 2011; Knaapen, 2014; Lambert, 2006). Because it is impossible for an individual clinician to grasp all such evidence, expert consensus reports (such as CPGs) are advocated; guidelines compile the evidence on a certain medical condition and deliver the evidence into health care providers' hands (Eddy, 2005; Lambert, 2006; Knaapen, 2014). EBM thus seeks to reduce uncertainty and divergence in medical decision making with CPGs (Armstrong, 2007; Hautamäki, 2018).

The systematic production and collection of evidence in biomedicine results in 'regulatory objectivity'; the standardization work produces tacit and explicit protocols that have a regulative effect in clinical knowledge and practice (Cambrosio et al., 2006; Timmermans and

* Corresponding author. University of Helsinki, Faculty of Law, P.O. Box 4 (Yliopistonkatu 3), FI-00014, Finland.
E-mail addresses: Jaakko.taipale@helsinki.fi (J. Taipale), lotta.hautamaki@tuni.fi (L. Hautamäki).

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Epstein, 2010). While advocates praise the guidelines for providing a stronger scientific foundation in medical decision making, critics stress the danger of ignoring the clinical expertise of medical professionals as well as the personal values and individual biological and social circumstances of the patients (Timmermans and Mauck, 2005; Knaapen, 2014; Knaapen et al., 2010; Hautamäki, 2018; Louhiala and Hemilä, 2005; Lambert, 2006). In practice, however, the guidelines do not always have the desired effect of consistent change in medical professionals' day-to-day clinical decision making (Timmermans and Mauck, 2005; de Jong et al., 2010), and are subject to practices of tinkering, circumventing or even subverting that are needed to enable the guidelines' applicability in clinical practice (cf. Timmermans and Epstein, 2010: 81).

How CPGs feature in court verdicts is an overlooked topic in the CPG literature despite its profound importance: how trial judges as non-experts perceive and make use of the guidelines is highly consequential to the courts' decision making, and by extension, to the courts' ability to deliver justice. Thus, though George Weisz et al. (2007: 716; see also Samanta et al., 2006) consider protection from legal action in clinical negligence cases among the varied uses of CPGs, this protection is merely one aspect of their potential legal power, as should become evident in the course of this article. In addition to expressing the consensus view of the involved field of expertise, CPGs provide a grid of intelligibility to the judges. Stefan Timmermans and Marc Berg (2003) have noted how guidelines "*coordinate – and thereby transform – the activities of the individuals who work with them*" (p. 63–64, original emphasis). Timmermans and Berg use the concepts of structuring, sequencing and temporal patterns. In the clinicians' accounts, the original empirical messiness and temporal pattern of the claim evaluation is organized anew (Timmermans and Berg, 2003: 66). What is significant in our analysis of the trial case verdicts, is that *the guidelines do exactly the kind of structuring, sequencing and temporal work* that Timmermans and Berg talk about. However, the case verdicts are written and argued for, in the end, by legal professionals, and not by clinicians. We argue that *employed in the legal domain, CPGs have the same coordinating effect* in the context of legal decision making, with important consequences for how legal courts use their jurisdictional discretion.

We examine the guidelines' influence in the context of 11 Helsinki district court traffic insurance compensation case verdicts. The case type features medical claims for and against alleged traumatic brain injury (TBI), presented as the cause of a plaintiff's impairment and disability (henceforth referred to as TBI cases). The TBI case-type is a prime example of a medical dispute that crosses boundaries into the legal domain. Prior to the court contestation, the defendant private motor insurers have decided not to compensate for these injuries, citing insufficient evidence and/or fraudulent or mistaken motives for insurance claims. The national social insurance supports the injured individuals, however, the level of these benefits is well below the level of loss of income compensation provided by the private insurer, not to mention the one-off injury compensation and rehabilitation support the traffic insurance compensation endows. These factors have prompted the legal challenge from the plaintiffs. The question under dispute in the courtroom is whether the plaintiffs have the injuries they claim to have, what level of severity the possible injuries are, and whether those injuries result from the designated accident. These questions establish the liability/non-liability to compensate.

To decide on questions of medical and legal causality and questions of the existence and severity of the injury, the Helsinki district court evaluates medical and psychological evidence and expert statements and testimonies supplied by both parties as well as by court-appointed experts. On average, the experts number well over ten in most cases, and include for example such specialist fields as neurology, neuropsychology, neurosurgery, neuroradiology, orthopaedics, psychiatry, physiatry and traumatology. What makes this case type interesting is the deciding actors' (judges') relative position to the expert evidence and testimonies they are supposed to evaluate: Finnish district courts are generalist courts, and trial judges lack scientific (medical and psychological) training and practical experience in the fields of expertise they evaluate. Judges are, thus, in a position of knowledge asymmetry vis-à-vis the experts, and have no means to reliably evaluate the veracity of what experts claim in courtroom (cf. Edmond, 2000; Edmond and Mercer, 1997; Jasanoff, 2005; Lynch, 2007: 19; Taipale, 2020: 21–25). This problem is exacerbated both by the adversarial court process and by the contradictory and inconclusive expert accounts that characterize the TBI case type (Taipale, 2019a).

Faced with the responsibility of deciding a case that features a medical expert dispute beyond their competence, judges as non-experts have to use a *medium of arbitration* that allows them to make sense of and order into the contradictory and inconclusive evidence. In TBI cases, such a medium is provided by the CPG for brain injuries (Brain injuries: CPG, 2008, 2017). For judges, the promise of the clinical practice guidelines is in the guidelines' status as a neutral, extra-courtroom consensus view concerning the best current practices in the diagnosis and care of brain injury.

Our results indicate that the guidelines for brain injuries shape the representation of evidence in the judges' TBI case verdicts. However, due to the issue of delayed diagnoses in the plaintiffs' medical cases, the empirical reality of these cases is somewhat different from the guidelines' ideal, and this discrepancy complicates the judges' evaluation of evidence and also affects the resolution of the cases. Conversely, the regulatory objectivity that underpins the CPGs' effectiveness is produced by concerted programmes of collective action (Cambrosio et al., 2006: 190), and the results of our study indicate that the TBI litigation also participates in that collective action. The contestation of medical evidence in Helsinki district court has had an effect on what the CPG for brain injuries assert to be proper clinical practice, which establishes a feedback loop between the patient-plaintiffs's cases and the guidelines.

In what follows, we first briefly introduce our data and methods. The next three sections discuss the CPGin the analysed verdicts. We finish with concluding remarks on the interaction between medicine and law in the TBI cases.

2. Data and methodology

This qualitative study examines clinical practice guidelines (CPG) in the context of traffic insurance compensation cases (TBI cases) contested at the Helsinki district court. The TBI case-type is exceptionally suitable for analysing the effect of CPGs in court: brain injury medicine is a specialist field that requires long-term training and experience to master, the field involves a considerable factor of clinical uncertainty, and the expertise on TBI diagnostics and care is a developing multi-professional field of expertise that involves experimental and contested medical methods of examination (Brain injuries: CPG, 2017; Katz et al., 2013; Lipton and Bigler, 2014; Taipale, 2019a; Valanne and Brander, 2013; Ware and Jha, 2015; Wortzel et al., 2014). In such specialist fields of expertise, CPGs have pronounced importance in organizing and transforming activities according to the best medical knowledge in order to improve the efficiency and quality of clinical practice (Timmermans and Berg, 2003: 63–66). In addition, the TBI cases at the Helsinki district court are borderline cases in which the medical evidence is contested by definition, and therefore the medical dispute about the injuries is also highly explicit. Thus, the guidelines also feature prominently in TBI case verdicts.

The investigation of CPGs in court was motivated by two preliminary interests: 1) how trial judges make use of these guidelines in their verdicts, which represent their evaluation of medical evidence and related expert claims, and 2) how the guidelines influence trial judges' perception of evidence. To answer these interests, we analysed the content of 11 TBI case verdicts from 2014 to 2017. The analysis was informed by close reading of and comparison with Finnish national clinical practices guidelines (Brain injuries: CPG, 2018, 2017) and by earlier studies on TBI in the courtroom (Taipale, 2019a, 2019b, 2020).

The lead author acquired the 11 TBI case verdicts from the Helsinki district court registry in two batches in December 2016 and March 2017. As the court verdicts are public documents, no ethical approval for their use was sought, and normal guidelines for ethical conduct of research were applied (Finnish National Board on Research Integrity). The TBI case verdicts are part of a broader pool of traffic insurance compensation cases, which number in their hundreds over the past fifteen years. The 11 verdicts were selected for closer analysis from a larger sample of 20 verdicts delivered by the registry based on a number of factors: the 11 verdicts featured heavy contestation over the medical evidence and presented expert claims, while most of the other 9 verdicts were short procedural verdicts, or featured issues other than brain injury as the main issue of contention, such as, for example, the level of insurance compensation and its basis in the expected income level of the plaintiff. Overall, the 11 verdicts are not fully representative of the traffic insurance compensation case-type, but they do capture the typical problems related to expertise in courtrooms.

The 11 verdicts were coded using Atlas. ti software. Preliminary analysis showed that the verdicts combine sections that can be characterized as legal-technical with *evaluation sections* that *present the judges' account of relevant medical evidence and expert positions.* The article acknowledges the complex relation between the analytical terms 'representation' and 'evaluation'. Our contention is that the verdicts, understood as accounts in which judges not only represent evidence but also justify their decisions, portray the judges' evaluation process as well. Put differently, the verdicts provide the best account of what judges deem as the most pertinent medical or testimonial evidence for their judgment. While the representation and evaluation are not used interchangeably, they are relevant terms for each other, for the judges do not only represent the evidence, they also justify and represent their evaluation process in the verdicts.

Focusing on the evaluation sections, the lead author conducted an open-ended topical coding examining judges' representation of evidence in all 11 verdicts. This first round confirmed that clinical practice guidelines have a prominent role in the analysed verdicts. The second round of coding focused on the topic of the CPG in the case data and singled out themes within the topic. Of these themes the most pertinent were:

- the structuration of judges' representation of evidence, which manifests concretely in the verdict text and amounts to a presentation of how judges valuate evidence, which in turn reveals how the two parties' (plaintiff and defendant) claims are received by the court
- the temporal pattern and evidence hierarchy; the delayed medical diagnosis in the plaintiffs' medical cases sits uneasily with the guidelines' diagnostic and treatment convention. The focus is on two themes of evidence in the verdicts: an early criterion for brain injury, the post-traumatic amnesia (PTA), and an imaging technology, diffusion tensor imaging (DTI).
- differences in expert opinion in connection to the CPG; contradictory expert claims are separated from the CPG, which further bolsters the guidelines' epistemic authority in court.

These themes were arrived at by using an iterative analytical strategy. Referring to Becker (2017), Aspers and Corte (2019) state that in qualitative analysis 'understanding is the result of research and is due to an *iterative process* in which data, concepts and evidence are connected with each other' (Aspers and Corte, 2019: 140, original emphasis). Thus, the analytical process was characterized by repeated movements between the case data and earlier literature on CPGs in a process akin to abductive reasoning (Shank, 2006).

The third round of analysis re-situated the analytical themes within the larger case context, and a comparison was made between the analytical themes and the two editions (2008, 2017) of the Finnish national clinical practice guidelines for brain injuries. This was done to further inform and validate the findings in the verdicts. All the analysed 11 court verdicts date before the new December 2017 edition of the CPG. Therefore, the court verdicts' discussion of the guidelines was compared to the older 2008 guidelines version to determine the possible influence that the guidelines have on courts' perception of medical evidence and expert testimony. In addition, changes between the 2008 and 2017 versions were compared with the court verdicts' discussion of evidence and extra-courtroom medical discussion concerning the development of guidelines, with the intent of determining possible changes in the CPG which would correspond with central concerns expressed in the TBI case verdicts, or concerns raised by the case type and the attending publicity in general. All original data is in Finnish and translated to English verbatim by the authors, preserving the original meaning in the verdict and guideline text.

3. Diagnostic and treatment guidelines and delayed diagnoses in the TBI cases

In the analysed verdict texts, the CPG is a prominent feature in judges' representation of the medical evidence. In all but one of the eleven analysed cases the very structure in the verdict section that deals with the evaluation of medical evidence is dominated by a straight referral to the brain injury guidelines' diagnostics section (cf. Brain injuries: CPG, 2008: 3). Typically, the verdicts repeat the CPG listing of diagnostic criteria and the criteria for differential diagnosis. Consider the following excerpt:

> The medical determination of a possible brain injury is based on the clinical practice guidelines. According to the guidelines, brain injury necessarily involves any one of the following symptoms caused by head trauma: loss of consciousness of any length, any type of amnesia related to events immediately before or after the accident, any change in mental abilities relating directly to the injury event, or a neurological symptom or finding that indicates brain damage and can be either permanent or passing. An indication of injury-related change in brain imaging examination is also sufficient [to determining injury]. The symptoms and the injury should have a clinically logical and probable connection, and differential factors should be taken into account in diagnosis. A brain injury diagnosis cannot be made on the basis of neurological and neuropsychiatric symptoms or abnormal neuropsychological test results that occur only later [after considerable time has passed from the injury event]. Instead, making a diagnosis requires that the aforementioned [early phase diagnostic] criteria is fulfilled. On the other hand it is stated that neuropsychological testing is relevant to diagnosing a brain injury patient. (Case 2)

In this example excerpt, the *judge repeats almost the exact wording of the CPG* at the beginning of the evaluation section, in which she justifies the reasoning behind the verdict (cf. Brain injuries: CPG, 2008: 3). The guidelines structure the verdicts by presenting the diagnostic criteria (five in all) and the guidelines for differential diagnosis as a checklist of symptoms and a hierarchy of medical procedures to verify these symptoms.

As shown above in the verdict excerpt, the diagnostic criteria and the guidelines for differential diagnosis in the CPG are based on the premise that the TBI diagnosis is placed right after the injury in the acute phase by medical professionals. In the clinical evaluation of lasting effects of the injury (the long-term effects and the extent of the damage) and in later determinations of disability, the focus should primarily be on first-hand information and descriptions of the events and early phase medical assessment of the injury complemented with interviews of individuals that have interacted or closely observed the patients to track the social indications typical of brain injury (Brain injuries: CPG, 2008: 19, 29). Early phase information and observations, preserved in acute care medical records, are thus most relevant in determining whether the patient has the alleged injury and whether it could have resulted from

the designated accident. Later examinations, both neurological and neuropsychological, are not as reliable, because there are so many confounding factors piling up which are hard to discern from the actual injury and its original cause. Again, consider this verdict excerpt:

> According to the CPG dysfunctions that are due to brain injuries are at their most severe during the weeks and months following the injury [event], and are then gradually reduced, some more, some less. Because of this, the CPG advocates that the symptoms the accident victim had soon after the accident should receive special attention [in determining the injury and its quality]. (Case 7)

The first sentence is *a direct quotation of the CPG for brain injuries* (Brain injuries: CPG, 2008: 19) *made by the judge*, while in the second sentence the judge summarizes the essence of the guideline text on the very same page.

However, the contested TBI patient cases present a problem to the court. The plaintiffs have typically received their traumatic brain injury diagnosis years (roughly 5-10 years in the 11 analysed verdicts) after the alleged cause of the injury. Brain injuries are frequently underdiagnosed in acute care (Liimatainen et al., 2016). Traffic accidents can cause multiple injuries to (e.g.) extremities or internal organs, which have a higher life-saving priority than detecting TBI; pain medication can conceal brain trauma; and acute care practices and resources might be deficient, leading to patients' symptoms being overlooked in the examinations. In the patient/plaintiffs' cases, impairment has manifested in their everyday life as tiredness or low energy, erratic behaviour, cognitive difficulties, or other neurological symptoms all typical but not specific to TBI. Once referred to a neurologist, these symptoms have been identified as TBI-related in neuropsychological tests, various imaging examinations and neurological assessment, including patient interviews, and then connected back to the designated injury event. The patients have then used the resulting diagnosis as a basis for insurance compensation claims, which have been denied by the insurance company. After the related board of appeals has not reacted favourably to the claim, the dispute has moved on to a specialized insurance court that has also decided the case against the plaintiff. As a last resort, the plaintiffs have initiated litigation in the Helsinki district court.

The passing of time between the accident and the brain injury diagnosis is of the essence here, as the court has to evaluate the existence of injury retrospectively. Combined with the fact that the early phase diagnostic criteria have to be met, the faith of the plaintiffs' claims lay in how judges perceive the relation between the late-stage diagnosis and the early phase evidence as specified by criteria laid out in the CPG. To describe this issue we next turn to the judges' representation of evidence concerning post-traumatic amnesia (PTA) and diffusion tensor imaging (DTI) in the TBI case verdicts.

The occurrence of PTA, one of the five minimum criteria for brain injury according to the 2008 CPG, is a heavily discussed diagnostic criteria in the eleven analysed verdicts. PTA refers to any kind of memory loss concerning events right before and after injury (Brain injuries: CPG, 2008: 3). Memory loss also provides a perfect example of delayed diagnosis in TBI cases: the guideline states that PTA should be monitored very closely in the acute phase and assessed with interviews continuously, or at least fairly soon after the accident (Brain injuries: CPG, 2008: 6, 9, 14). Because of the time gap between the litigation and the accident, acute-phase medical records become very important for judges' assessment of the case. However, the information the medical records contain is often found deficient and/or inconclusive: 'Taking account of the accident mechanism, medical professionals have been critical to a degree regarding the adequacy of acute care and the comprehensiveness of the medical record notes.' (Case 6.)

In the verdicts the judges often point out how no-one has asked the patient about PTA in the acute phase, and the degree of the cognitive and other disabilities are only revealed when the TBI-related impairment affects the patient-plaintiff's everyday activities (e.g. case 9). The deficiencies in acute care practices and resources are a widespread problem, and similar problems also pester UK and US medical practices, at least according to the plaintiff's expert witness neurologist *Z*, who instead emphasizes the relevance of later neuropsychological examinations in determining early phase PTA (case 9). The following excerpt from a case verdict contains a similar acknowledgement concerning deficient practices in acute-phase care of TBI patients:

> There is no indication of brain injury in conventional MRI examinations, which becomes apparent from all expert statements. However, all experts and especially radiologists agree that [the plaintiff] has not been subject to imaging examinations in the optimal time frame, that is, right after or very soon after the accident. Experts have also otherwise been critical of the deficient acute care examinations, especially regarding PTA. There is no mention [about the plaintiff's] neurological state or recollection in early phase medical records, including a mention of memory loss. It is apparent that memory loss has not been examined. There is evidence of [the plaintiff's] memory problems based on [the plaintiff's and another witness's] testimonies and mentions in later medical records. Based on this, a memory loss cannot be ruled out. (Case 11)

Either important examinations relating to PTA have not been made or they have not been logged with sufficient detail and precision to allow for reliable assessment later on down the line. Without this acute-phase information, the late-stage diagnoses are *by necessity* based on neuropsychological examinations and medical professionals' interviews with the patient-plaintiff and people who have shared everyday life with them. However, the defendants' experts strongly criticize neuropsychological testing as subjective and therefore unreliable (Taipale, 2019a), while TBI case judges also note that 'some of the featured medical professionals have more strongly perceived that PTA can reliably be assessed also in later stages' of TBI (case 6). Thus, whether a PTA can be reliably assessed retrospectively at all is a contested issue in TBI cases. Consider also the next excerpt, in which the judge discusses negative expert claims about retrospective assessment of PTA:

> Determining PTA years after the [accident] event was not reliable, because PTA had the tendency to lengthen the longer the time had passed. [Defendant's expert, neurologist] *G* considered it a pity that doctors uncritically believe what patients tell them. It is quite normal that people have no accurate recollection after a long time has passed from the event. [According to *G*, the plaintiff's] memory had functioned normally. Expert *R* has stated that making a PTA examination retrospectively generates 'a plethora' of confounding factors, a fact that was also addressed in the CPG. In [the plaintiff's] case, there was no primary phase evidence that would support the existence of PTA. (Case 7)

In this excerpt, the plaintiff's medical experts assert that there is acute-phase evidence of brain injury, whereas the defendant's experts, drawing on the diagnostic criteria in the CPG, deny the reliability of retrospective assessment and point out how unreliable patient interviews are in determining PTA. In this particular case verdict the defendant's position on the evidence prevailed, and the judge explicitly mentioned the lack of credible evidence for PTA as one of the deciding factors in the verdict (case 7). The critical outlook on retrospective assessment of brain injury is also congruent with the perception in the medical community that late-stage brain injuries are regularly overdiagnosed in clinical practice and patients' symptoms falsely determined as having been caused by a TBI, despite other plausible causes existing (Liimatainen et al., 2016).

In case types similar to TBI cases, in which the medical diagnosis is disputed and the medical issue complicated because of lack of tangible medical evidence, brain imaging technologies can sometimes provide some tangible findings to work with (e.g. Dumit 1999). The medical findings provided by diffusion tensor imaging (DTI) examination are

typically brought to court by the plaintiff's side. DTI is an MRI technique that can be used to examine the brain's white matter (axonal) tracts and their possible traumatic changes. As already shown, the 2008 CPG edition mentions brain imaging examination findings as one of the five *early phase* criteria that indicate brain injury in the patient. Reading from Valanne and Brander (2013: 1450), it is precisely the kind of patients that feature in TBI cases who hope to gain diagnostic support from DTI. These patients have in the acute phase been underdiagnosed or perhaps classified as suffering only from a mild brain injury. Conventional MRI examinations have not produced any indications of injury-related changes in the plaintiffs' brain; however, their impairment and disability has persisted beyond a reasonable period of convalescence.

What is evident from medical literature is that DTI is considered a developing and experimental examination method (Valanne and Brander, 2013), and that its medico-legal use is conducive to misapplication (Wortzel et al., 2014; but see also Lipton and Bigler, 2014 for criticism of Wortzel et al.). DTI certainly comes across as medically controversial in the analysed TBI-case verdicts. Consider the following excerpt:

> The late manifestation of the symptoms and the lack of findings in the acute phase and late-stage brain imaging examinations speak against the position that the plaintiff's present symptoms are causally connected to the traffic accident. The findings in diffusion tensor imaging are not sufficient evidence of brain injury, taking account of the fact that the examination method is not an established method in the diagnosis of brain injury. (Case 5)

This judge's assertion in the verdict is borne out of evaluating expert evidence and testimonies presented in court. DTI is discussed in length in all of the 11 case verdicts, and DTI findings are generally judged by the district court to be credible as complementary evidence if other diagnostic criteria indicate brain injury. The verdicts' occupation with the imaging technique is explained by the perceived, although contested, capability of DTI to detect brain injuries that conventional MRI does not capture, including *late stage* diffuse axonal injuries. However, the 2008 edition of the CPG mentions DTI only in passing, with very little emphasis on the examination method (cf. Brain injuries: CPG, 2008: 9–11, 23–24). The CPG provides little guidance in terms of assessment of this imaging examination technique and its reliability and validity, apart from stating that DTI is 'recommended in special cases, because it can evidence traumatic changes that can not be determined with other [MRI] techniques.' (Brain injuries: CPG, 2008: 23). This passage is quoted by four of the eleven case verdicts directly (cases 3,5,6 and 9).

What the discussion about PTA and DTI in the verdicts in general shows is that the patients' paths in the health care system from acute care to rehabilitation affects the credibility of their claims in court. In the TBI cases *there is a clear temporal discord* complicating the evaluation of the presented medical evidence, *a contradiction between the CPG's normative emphasis on acute-phase criteria in determining the injury, and the actual characteristics of the patients' medical cases, which involves a delayed diagnosis*. This is the basic problem in applying standardised guidelines into individual patient cases (Hautamäki, 2018; Knaapen, 2014; Lambert, 2006; Timmermans and Mauck, 2005), here manifesting itself in the courtroom context. In the TBI verdicts, this temporal misalignment is explained as a matter of confounding factors for later examinations, as typical fragmentation of memory, and cross-pollination between the patient's original memories and received memories about the injury. Thus, *the misalignment between the delayed diagnosis and what the ideal of acute-phase diagnosis would be according to the CPG inevitably sets the plaintiffs into inferior evidential positions vis-à-vis the defendants.*

The temporal hierarchy in TBI diagnosis and the means to examine the patient, both outlined in the CPG, structure the patient-plaintiffs' cases both outside the court in their lives before the litigation and inside the court where the judges rely on these same temporal hierarchies. The problem, however, originates outside the court in the medical disputes of how TBI should be diagnosed and treated. These 'differences in line' come into play in how the judges make sense of differing testimonies from the expert witnesses.

4. CPG and 'differences in line' in the TBI cases

The differences in expert opinion are explicitly discussed by the judges in many of the case verdicts. In most such passages, the judge notes the disagreement between experts by referring to 'differences in line' or to differences in 'schools of thought' relating to TBI diagnostics and care. In many ways, these differences are the crux of the case, as part of the argument of this paper is that the guidelines delimit the alternative interpretations of medical findings presented by experts. Thus, what is most important to note here is that the brain injury clinical guidelines, understood by the judges as a consensus statement, run against such differences in line among testifying experts.

The authoritative position of the guidelines becomes increasingly clear in one of the case verdicts, in which the CPGs themselves become a discussion topic. Consider the following excerpts:

> [The plaintiff's expert, neurologist] *Z* stated that there are no schools of thought in the world of science. In general, there exists a shared understanding about what happens in the brain. The clinical practice guidelines are correct, but they can be interpreted in many different ways. For example, amnesia can be either short or long, if it has not been [properly] assessed. Neuropsychological examination cannot diagnose brain injury, and the examinations are rather a part of the larger whole [of different types of examinations].
>
> The [said neurologist] acted as a chair in the CPG working group in 2005, but was forced aside due to difference of opinion. Two insurance physicians had expressed distrust towards him, and he was released from the task. [*Z*] already then participated as an expert in trials [similar to this case]. [According to *Z*] neurologist *T* has treated brain trauma patients for 20 years and has familiarized himself with the topic in international meetings. The same cannot be said of the insurance physicians, who haven't been seen in international meetings. (Case 9)

In this excerpt, as noted by the judge, the CPG is portrayed as having a political quality, as insurance medicine specialists have allegedly worked to oust the testifying expert from the CPG working group. The neurologist, testifying for the plaintiff, translates the medical issue into a contestation between insurers' economic and power interests *and* proper medical practice and perspective in the diagnostics and care of traumatic brain injuries. The insurance doctors' competence is called into question by asserting the competence of a fellow expert whose medical practice had been criticized by the defendant's experts.

In the next passage, the expert states that the guidelines are correct, but there are practitioners who deviate from them, and this signals improper medical practice:

> According to [defendant's expert, neurologist *H*] there are no different schools of thought. Instead, there are [neurologists] who do not abide by proper diagnostic practices, that is, generally accepted principles such as the national clinical practice guidelines. It is not a question of different understandings of for example imaging. According to *H*, this kind of practice is not proper. If one slips from the clinical practice guidelines, the slip must be legitimately grounded. In legal praxis evaluation has been based on the clinical practice guidelines. (Case 9)

The defendant's expert also affirms the central role that the CPG has for courts' evaluation of expert claims, and also their obligatory character to medical professionals, lest they should divert from proper medical practice. Similarly, the expert in question places authority concerning imaging examinations on the CPG.

This downplaying of the political character of guideline development and the expressed propriety of abiding by the guidelines is interesting in the light of earlier social scientific literature that discusses CPGs, in which consensus statements are shown to be a product of negotiation and agreement on contradicting, inconclusive or non-existing scientific evidence (Cartwright, 2011; Deaton and Cartwright 2018; Kelly et al., 2010; Knaapen, 2013; van Loon et al., 2014), crafted by a specifically convened group of medical professionals, and increasingly involving patient advocates as well. Thus, rather than being technical documents of best scientific evidence, CPGs are developed in a process that combines and contrasts pragmatic and political concerns with the epistemological concerns of the statistical procedure that produces the evidence hierarchy (Knaapen et al., 2010; Moreira, 2005).

Another way to circumvent the tension between the guideline consensus and the obvious "differences in line" between the featured experts is to emphasize the field as being fundamentally contested:

> [According to a court-appointed expert, neurologist *A*, the field of TBI diagnostics and care] produces weekly circa 20 000 medical studies, and everyone can find a study that supports their purposes. That is why single studies should not be given much weight. Instead, textbooks and guidelines gather reliable and acceptable knowledge from [all these studies]. Witness *Z* [another neurologist, but for the plaintiff's side] has stated that in the field [of TBI diagnostics and care the medical studies'] results have variance, which is typical with almost anything that concerns brain injury. (Case 3)

The expert's statement also expresses the idea that the field itself is characterized by a high prevalence of interpretative flexibility (Collins, 1981), which further increases the relevance of abiding by the guidelines' consensus opinion.

In sum, *the clinical practice guidelines are not questioned in the TBI verdicts, not even when the guidelines become a focal point of discussion. This is an indication of their strength as a medium of arbitration for contested expert claims*, and an indication of their power as *a grid that structures and coordinates the presented medical evidence* (cf. Timmermans and Berg, 2003: 63–66). Put differently, the adherence to the guidelines is an indication of the CPG's regulatory objectivity (Cambrosio et al., 2006) functioning in the courtroom.

The medical experts' willingness to affirm the guidelines might be due to two factors: first, the experts have clinical experience and the reflexivity it endows about how clinical patient cases are accommodated into the guidelines' ideal conventions. Second, the experts' epistemic credibility in the courtroom is influenced by the guidelines as much as it is influenced by their prestige and credibility in the field of expertise. Consensus, understood here as conventional textbook medicine expressed in a consensus statement – the CPG – involves a highly authoritative determination of what is proper medical practice. To run counter to what the CPG recommends is a risky strategy even for professionals highly respected in their fields, for that might compromise their professional credibility not only in the courtroom, but possibly also in a much wider domain (cf. Armstrong, 2007; Timmermans, 2005). This explains why respected professionals featured in the TBI-case verdicts downplay any signs of power play in guideline development, and perhaps especially so if they are on the wrong side of the criticism (cf. Castel, 2009; Knaapen et al., 2010; Moreira, 2005). That is why 'differences in line' and acknowledgements of politics of knowledge are diverted into problems relating to improper practice of individual professionals and their ungrounded alternative interpretations of the evidence. In this way, the guidelines become the received understanding against the background of which the participants of the legal process battle over the correct understanding of the disputed issue.

5. The feedback loop between the patient-plaintiffs and the CPG

The preceding discussion covers the issue of how clinical practice guidelines influence courts' representation of medical evidence. However, we propose that the relationship between law and medicine is a two-way affair, acknowledging that legal courts also have a role in promoting, producing and transmitting expertise (Jasanoff, 2015: 1748). Thus, there is a multifaceted feedback loop between the patient-plaintiffs' medical cases and the CPG, a loop mediated by the TBI litigation. This feedback loop resembles what Ian Hacking (2002, 2007) has called a looping effect to describe how psychiatric standards and people being diagnosed change in a dynamic process of interaction. In this case, the CPG is a moving target, changing in interaction with not only the medical knowledge of traumatic brain injuries, but also in interaction with the TBI litigation, in which perceptions of proper TBI diagnostics and care become challenged and affirmed (cf. Timmermans and Berg, 2003: 23).

The Finnish CPG for brain injuries was updated in 2017, with important changes from the 2008 edition. In the latest CPG edition, acute care and its careful documentation is considered paramount for efficient care and mitigation of the consequences of the injury in patients' lives:

> Determining the exact injury mechanism and rigorous recording of information about both the event and performed examinations are centrally important for early care and evaluation and also for safeguarding patients' rights. (Brain injuries: CPG, 2017: 3)

Even though these concerns were present in the 2008 edition (e.g. p. 8–9), they are much more central and visible in the latest edition. The motivation for the new emphasis is of course ingrained in the guidelines' central aims to mitigate the negative consequences of very diverging, mistaken or even lacking practices of care, diagnosis and documentation of TBI in acute care in Finnish medical facilities. As already discussed, the underdiagnosis of brain injuries has been noted as a palpable problem in Finnish acute care (Liimatainen et al., 2016). The 2017 CPG working group implicated uniform practices as a further factor that increases the reliability of acute care decisions and diagnoses, and also lessens the possibility that a brain injury is left underdiagnosed. According to medical news sites and journals, the tools for standardization and for adopting better practices are now available, and medical personnel should be able to develop their activities accordingly (Mediuutiset, 2018; Duodecim, 2018).

The changes in the CPG, which can be understood as an expression of the increasing standardization of medical knowledge intrinsic to EBM (Timmermans and Berg, 2003), are perhaps best captured by the differences in how DTI was accounted for in the 2008 and 2017 guidelines. As we discussed, the use of DTI in TBI diagnosis received only a passing mention in the 2008 edition of the guidelines, in the section that discusses long-term effects and late-stage examinations and diagnostics of brain injuries (Brain injuries: CPG, 2008: 23). In the updated 2017 edition, DTI is more firmly classified as level D in the evidence hierarchy. The letter D indicates that there is scarce or contradictory evidence of the imaging examination's value in diagnosis. DTI findings are now deemed characteristically non-specific, which means that other non-injury or accident-related causes cannot be excluded by this method (Brain injuries: CPG, 2017: 5).

The changes in the clinical practice guideline obviously stem from the medical need for stronger emphasis on solid acute-phase clinical work and a related emphasis on patients' rights. The timing of these changes, however, suggests that the medical core has, in addition to the clinical medical concerns discussed above, also taken notice of the ongoing legal challenge in the TBI cases at the Helsinki district court. To begin, the majority of the neurologists involved in these cases as expert witnesses are leading specialists in the Finnish medical field of TBI diagnostics and care. Further, Suvi Liimatainen et al. (2016) note in their article that many cases of TBI litigation could be avoided if acute medical care clinics would comply with the CPG recommendations of acute care and diagnosis. In August 2017, a group of 22 practitioners

involved in brain injury medicine authored an opinion piece in finnish medical journal *Lääkärilehti* that comes across as a medical circular (Liimatainen et al., 2017). In the text, the group directly refers to the TBI litigation and calls for more rigorous application of uniform acute-care practices based on the CPG for brain injuries. Moreover, the TBI cases also have a longer history of being noted by medical professionals: an exchange in the Finnish medical journal *Duodecim* over TBI cases featured insurance physicians and neurologists arguing about the possibility that medicine (or medical facts) could change in court depending on whether the court is a specialist court with in-house medical expertise or a general court with no in-house expertise in the evaluated matter (Havu, 2006; Huttunen, 2006; Tenovuo, 2006). Concerning DTI, the medico-legal difficulties of borderline cases and delayed diagnoses have been noted in medical literature, and the value of DTI in diagnosing brain injury and in detecting late-stage injuries has been presented as suspect (Valanne and Brander, 2013; see also Wortzel et al., 2014). The formulations regarding DTI in the 2017 edition of the CPG certainly resonate much better with the expert testimonies and discussion in the analysed TBI case verdicts than the 2008 edition does.

The heavy media attention surrounding TBI cases has also alerted the public to the medical contestation on injuries in TBI cases. This has not escaped the medical professionals, who have also been interviewed for some of these stories (Helsingin Sanomat, 2018; Suomen Kuvalehti, 2016; YLE, 2017). In July 2017 a current affairs programme on the national television featured a prominent lawyer involved in the TBI litigation debating the nature of the medical evidence in the TBI litigation with one of the leading insurance physicians in the country (YLE A-studio, 2017). The physician, who was highly critical of the type of diagnoses now disputed in court, was also a member of the medical guideline development group that authored the new CPG in December 2017. The effects of the CPG changes relating to DTI were also discussed in a 2018 newspaper article about a private legal office specializing in TBI cases (Turun Sanomat, 2018). According to the interviewed lawyers, the latest CPG edition has omitted particular features that were important for the plaintiffs' claims in the TBI cases analysed here. If sources of uncertainty typical to the TBI litigation are removed, it also suggests that litigation has had an effect on the latest edition of the guidelines.

All the presented aspects of the issue suggest that the Helsinki district court TBI litigation has influenced the related clinical guideline development. Thus, extra-medical actors, institutions and interests have participated in the collective process of producing regulatory objectivity (Cambrosio et al., 2006) in clinical medical practice. This highlights the nature of the standardization of medical facts (the best medical evidence base for TBI diagnosis) in the CPGs as a moving target, something that changes in a dynamic process of interaction with its field of application (Hacking 2002, 2007; Timmermans and Berg, 2003: 23). We have shown the Helsinki district court TBI litigation to be part of this collective process.

6. Conclusions

The TBI cases in the Helsinki district court are an example of how insurance and medical disputes unfold in legal courts. CPGs have been the subject of numerous studies analysing, for instance, the medical rationale of the guidelines, guideline development and their clinical use, the decision making that precedes the evidence hierarchies, and the CPGs' influence upon medical professionalism (e.g. Cartwright, 2011; Knaapen, 2014; Knaapen & al. 2010; Lambert, 2006; Timmermans and Berg, 2003; Weisz et al., 2007). The novelty we bring is in describing how CPGs as standards of clinical diagnosis and care, and the associated clinical objectivity (Cambrosio et al., 2006: 197), are applied by non-medical experts (judges) in evaluation of testimonial and other medical evidence in the unintended context of a legal court.

Analysing 11 Helsinki district court traffic insurance compensation case verdicts, we showed how the Finnish national CPG for brain injuries influences the judges' representation of evidence in the TBI case verdicts. In the verdicts, the judges used the CPG as a *medium of arbitration* to make sense of and order, or coordinate, the contradicting and inconclusive medical claims and evidence regarding TBI. However, if the 'outcomes that standards achieve depend on the specific standards and circumstances under which they are made to work' (Timmermans and Epstein, 2010: 84), what outcomes can we expect in the TBI case context, in which the standards are applied by non-experts?

Our analysis shows how the guidelines structure, sequence and initiate temporal work in the TBI verdicts (cf. Timmermans and Berg, 2003: 63–66). As the CPG stresses the relevance of acute-phase diagnostic criteria, the judges are directed to focus and put more weight on evidence concerning the early phase of the plaintiffs' injuries. We showcased the verdicts' consideration of post-traumatic amnesia (PTA) and diffusion tensor imaging (DTI) as examples of this. We discussed these themes in relation to the patient-plaintiffs' typical patient case histories, which feature a delayed diagnosis given 5–10 years after the accident. This temporal misalignment influences how judges perceive and valuate medical expert and testimonial evidence in the TBI cases.

As we have discussed in this article, the difficulty of applying the abstract guidelines in actual patient cases is a general problem with CPGs that affects clinical practice (Timmermans and Mauck, 2005; Knaapen et al., 2010; Lambert, 2006). However, the issue might be even more pronounced when non-expert judges use the guidelines as a medium of arbitration in the courtroom evaluation and case verdict presentation of evidence. The issue here is that judges do not have the clinicians' medical training and experience, and thus lack the clinicians' reflexivity in applying the guidelines to the specific individual patient case.

The TBI cases feature contested and contradictory expert claims and inconclusive evidence, which creates a decision-making problem for the judges. The value of the CPG is that it provides the judges with an extra-legal expert consensus view on the disputed issue, one that is perceivably neutral with regard to the trial parties' views on the disputed issue. Our analysis of the TBI verdicts also evidences the manner in which the epistemic authority of the CPG is affirmed by medical experts in the courtroom. Instead of admitting any differences of line or schools of thought in medicine, the experts turn these disagreements into questions of the deficient practice and competence of individual practitioners. In the judges' perception, this has the effect of strengthening the epistemic authority of the guidelines.

As our discussion indicates, the TBI litigation, as well as related exchanges in medical journals, medical news and news media articles, also have an effect on the Finnish CPG for brain injuries. We suggest that in this instance, legal contestation takes part in the collective process of producing clinical objectivity (Cambrosio et al., 2006: 190, 197), and thus influences also the related clinical practice. There is a feedback loop akin to a looping effect (cf. Hacking, 2002, 2007) between the patient-plaintiffs' medical cases in the TBI litigation and the CPG, a co-constitutive cycle between the legal and medical domain, in which disputes inside the medical community and media publicity are also part of the dynamic process of interaction (cf. Jasanoff, 2004).

It is clear that CPGs as authoritative epistemic objects have potential legal power that reaches beyond their application in medical malpractice cases (Samanta et al., 2006). Our analysis focused on how they feature in the judges' representation of expert testimony and evidence in the TBI case verdicts. Through these verdicts, the courts' institutional authority not only affirms the epistemic authority of the medical guidelines in the courtroom, but also affects the CPG's content and therefore also the clinical practice the guidelines regulate. This should be informative to such studies in other jurisdictions that examine the common problem of how judges who lack scientific training and experience manage to make use of scientific evidence, expert testimonies and guidelines in their decision making (cf. Edmond and Mercer, 2000; Kirkland, 2012) Furthermore, this article serves as a local example for further studies that examine the use of any set of evaluative criteria in evaluation and representation of expert claims and evidence in different

types of decision making and institutional contexts (cf. Taipale, 2020: 54–62). Clinical practice guidelines certainly seem to reach past their native contexts of application. This study about how CPGs influence courts' perception of evidence is an elaboration of the argument that guidelines, understood as epistemically authoritative objects, structure, sequence and do temporal work in their contexts of use (Timmermans and Berg, 2003: 63–66). Our notion of *medium of arbitration* serves to abstract this usage of guidelines and criteria from the context in which the guidelines are produced and used. The notion directs attention to the way in which these authoritative epistemic objects travel across institutional and professional boundaries into novel contexts of application. It also spotlights how these contexts might have a feedback effect on the medium itself and the practices the medium regulates in the context of origin.

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