Evaluation of the Quality of Information on the Internet Available to Patients Undergoing Cervical Spine Surgery

Alexander G. Weil[1], Michel W. Bojanowski[1], Jacques Jamart[3], Thierry Gustin[2], Marc Lévêque[4]

OBJECTIVE: **To evaluate the quality of information available on the Internet to patients with a cervical pathology undergoing elective cervical spine surgery.**

METHODS: **Six key words ("cervical discectomy," "cervical foraminotomy," "cervical fusion," "cervical disc replacement," "cervical arthroplasty," "cervical artificial disc") were entered into two different search engines (Google, Yahoo!). For each key word, the first 50 websites were evaluated for accessibility, comprehensibility, and website quality using the DISCERN tool, transparency and honesty criteria, and an accuracy and exhaustivity scale.**

RESULTS: **Of 5,098,500 evaluable websites, 600 were visited; 97 (16%) of these websites were evaluated for quality and comprehensiveness. Overall, 3% of sites obtained an excellent global quality score, 7% obtained a good score, 25% obtained an above average score, 15% obtained an average score, 37% obtained a poor score, and 13% obtained a very poor score. High-quality websites were affiliated with a professional society ($P = 0.021$), had bibliographical references ($P = 0.030$), and had a recent update within 6 months ($r = 0.277$, $P < 0.001$). No correlation between global quality score and other variables was observed.**

CONCLUSIONS: **This study shows that the search for medical information on the Internet is time-consuming and often disappointing. The Internet is a potentially misleading source of information. Surgeons and professional societies must use the Internet as an ally in providing optimal information to patients.**

INTRODUCTION

The Internet has become one of the first places patients go to when they seek information regarding their disease and treatment. Studies show that three quarters of American adults access the Internet, and 60% of them regularly search online for medical information (10). A significant proportion of these patients make medical decisions based on the information they find on the Internet (10, 25) and inconsistently discuss their findings with their physician (10). It is important to assess the quality and reliability of information available online to patients. We sought to evaluate the quality of information available to patients undergoing cervical spine surgery by entering procedure-related key words of common (e.g., cervical fusion) and controversial (e.g., arthroplasty) cervical spine procedures.

METHODS

Website Identification

We based our approach on a patient with a cervical spinal pathology undergoing an elective cervical spine procedure. It is well known that patients search health information on the Web by entering key words in search engines (9). We reproduced the patient's typical online research strategy by entering six different cervical spine procedures into the two most popular search engines, *Google* (85.68%) and *Yahoo!* (4.43%), without using restrictive factors such as language, format, file, date, or domain name (9). We entered six key words, including three relatively common procedures ("cervical discectomy," "cervical foraminotomy," "cervical fusion") and three more contemporary and controversial procedures ("cervical disc replacement," "cervical arthroplasty," "cervical artificial disc") (**Figure 1**).

For each key word, the first 50 websites were visited in each search engine (6 key words × 2 search engines × 50 first websites = 600 websites visited). The number 50 was chosen

Key words
- Cervical surgery
- Disc replacement
- Fusion
- Internet
- Quality of information

Abbreviations and Acronyms
EC: European Community
GQS: Global quality score
HON: Health on the Net

From the [1]Department of Surgery, Section of Neurosurgery, Centre Hospitalier de l'Université de Montréal (CHUM), Hôpital Notre-Dame, Montréal, Québec, Canada; [2]Service de Neurochirurgie, [3]Centre de Biostatistique, Cliniques Universitaires UCL de Mont-Godinne, Yvoir, Belgium; and [4]Service de Neurochirurgie Fonctionnelle et Stéréotaxique CHU, Hôpital d'adulte de la Timone, Marseille, France

To whom correspondence should be addressed: Marc Lévêque, M.D. [E-mail: marclevequemd@gmail.com]

Citation: World Neurosurg. (2014) 82, 1/2:e31-e39. http://dx.doi.org/10.1016/j.wneu.2012.11.003

*Journal homepage: **www.WORLDNEUROSURGERY.org***

*Available online: **www.sciencedirect.com***

1878-8750/$ - see front matter

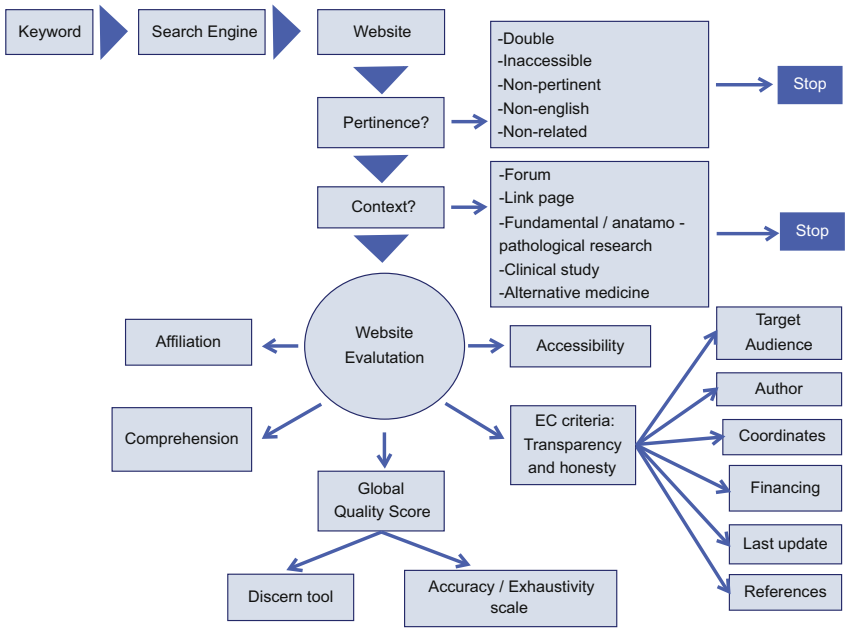

Figure 1. Method of selection and evaluation of websites.

because the literature has shown that websites beyond the first 30 are usually not pertinent (15). Also, it has been shown that 97% of left mouse clicks produced during an Internet search are exerted on the first 10 websites (including its links) that appear on the search engine (9).

Exclusion Criteria

Of the 600 websites we visited, we first excluded websites that were inaccessible, had nonpertinent information, were doubles, were non-English, or were nonrelated to the key word. The websites were then grouped into seven categories based on the type of information they provided: general information, information regarding treatment, anatomic or fundamental research findings, clinical studies, or forums. This study evaluated Web-based information valuable to the patient, so we included only websites that provided general information or information regarding treatment and excluded websites belonging to the other five categories (**Figure 1**) (27).

Evaluating Website Accessibility

Website accessibility was determined by the rank of the website on the search engine and by the number of links directed toward the site. These data were calculated on the search engine *Google* using the "link:" function followed by the URL address of the website for which we wished to know the number of links (22).

Evaluating Website Quality

Comprehension. Two independent observers without medical or paramedical training evaluated website comprehension. Websites were classified into three categories: comprehensible, difficult to understand, and incomprehensible. The files containing the addresses of the websites were given to each observer in a random order to avoid the bias of learning that could render websites encountered later easier to understand.

Information Quality. There is no consensus regarding the optimal method or tool to evaluate the quality of information on the Internet (22). In this study, three tools were used to evaluate website quality: the Quality Criteria for Health Related Websites established by the European Community (EC) (7), the DISCERN tool for judging the quality of written consumer health information on treatment choices (6), and a 10-point scale used by two independent neurosurgeons (A.G.W., M.L.) to evaluate website accuracy and exhaustivity.

EC Quality Criteria

The EC developed a program called "e-health Europe 2002" that lists high-quality websites and promotes good health practice on the Internet. Among their criteria (**Table 1**), we retained website "transparence and honesty." We evaluated whether websites stated the author's contact information (name and postal and electronic address), source of financing, and readership. The "authority" and "updating of information" categories of the EC criteria were already evaluated using three questions of the DISCERN tool.

DISCERN Tool

The DISCERN questionnaire is a reliable and valid (1, 2, 7, 14, 15, 18, 19, 22) tool developed by the University of Oxford and the British Library (**Table 2**). The DISCERN tool is a battery of 15 questions; each question ranks the quality of information from 1–5. This tool evaluates the objectivity and exhaustivity of