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Review Article

Systematic review of the incidence of discitis after cervical discography

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Abstract

BACKGROUND CONTEXT: Cervical discography is not uniformly used in part because of the fear of discitis. Studies report widely varying rates of this life-threatening infection.

PURPOSE: The aim of this study was to estimate the incidence of discitis after cervical discography, delineate the consequences of discitis, and identify factors that may influence this complication.

STUDY DESIGN: Meta-analysis.

METHODS: Studies pertaining to cervical discography were identified by a literature review and bibliographic search. These were screened for inclusion into the meta-analysis by two reviewers. Data were collected on a wide range of clinical and demographic variables including age, gender, morbidities, number of patients, number of discograms, use of prophylactic antibiotics, type of surgical prep, number of needles used, and the number of patients and discs infected. Primary data were used to calculate the incidence of discitis per patient and per disc.

RESULTS: Fourteen studies were included in the analysis. Both procedural details and demographic information on patients were missing from eight studies. The mean age of patients ranged from 41 to 47 years, and gender distribution varied greatly. Antibiotics use was reported in three studies. Cervical discography was complicated by postprocedural discitis in 22 of 14,133 disc injections (0.15%) and 21 of 4,804 patients (0.44%). Only one patient suffered from an infection at more than one spinal level.

CONCLUSIONS: The rate of discitis after cervical discography is relatively low. This can perhaps be further decreased by the use of prophylactic intradiscal antibiotics. Should the ability of cervical discography to improve surgical outcomes be proven, the fear of discitis should not preclude performance of disc provocation. Published by Elsevier Inc.

Keywords: Discography; Cervical discography; Cervical discs; Discitis; Neck pain; Meta-analysis

Introduction

Neck pain is a challenging medical condition affecting a substantial percentage of the general population. In a report by the Task Force on Neck Pain and Associated Disorders, Hogg-Johnson et al. estimated the 12-month prevalence of neck pain to range between 30% and 50%, with the rate of debilitating neck pain varying between 1.7% and 11.5% [1]. Most epidemiological studies show the incidence to be somewhat higher in women than men and to peak in middle age [1–6].

Discography was first employed over 60 years ago to facilitate the identification of a herniated disc [7]. However, its use in this manner has since been supplanted by less invasive, safer, and more sensitive imaging techniques. Although the past two decades have witnessed a significant decline in the use of discography, the technique has continued to evolve and be redefined. Despite lack of clearly demonstrated utility and validity, the current principal use of cervical discography is to select patients with chronic neck pain without significant neurological symptoms for surgical intervention [8].

FDA device/drug status: not applicable.

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One of the main reasons for the low success rates for spine surgery done for axial pain [9–12] is the inherent difficulty in identifying suitable candidates. The scope of this challenge becomes manifest in studies examining the radiological spine findings in asymptomatic individuals. Regardless of the spinal region or demographics of the population, most have demonstrated significant pathology in over 50% of asymptomatic volunteers [13–18]. Proponents of discography contend that it is the only diagnostic spine procedure that purports to correlate symptoms with pathology [19–21]. But whereas older literature suggests that cervical discography may improve fusion outcomes [22] and reduce recurrence [23], the preponderance of evidence supporting routine discographic screening is weak and anecdotal [24,25]. This lack of demonstrable utility may be one reason the use of cervical discography has declined [26]. In addition, one of the factors that separates discography from other diagnostic tests is that it carries a higher risk of catastrophic complications, most of which stem from discitis [27,28].

The literature on cervical discography is scant and dated. In fact, a majority of articles on this topic pertain to lumbar discography, which for various reasons is associated with a lower discitis rate than discograms done in the neck [29]. The objective of this systematic review is twofold: to estimate the incidence and consequences of procedure-related discitis and try to identify which factors, if any, influence the likelihood of this complication.

Methods

Search methodology

Studies pertaining to cervical discography were identified by a literature review using the search engines Medline and Embase. The database was searched using the terms ''cervical AND fusion,'' ''cervical AND discography,'' ''cervical AND diskitis,'' ''cervical AND discitis,'' ''cervical AND discography AND complication,'' ''cervical AND fusion AND discography,'' and cervical AND disc replacement AND discography. No restrictions were placed regarding the year of study, language of publication, or location of publication. The PubMed database was also searched using the MeSH term ''discitis'' with the subheading of ''complication'' combined with free text ''cervical.'' The bibliographies of all included studies were then manually searched for additional studies meeting inclusion criteria.

Inclusion and exclusion criteria

Studies were screened for inclusion in this meta-analysis by two independent reviewers (SGK, JH) who used the title, abstract, and/or the full publication to decide if the article was appropriate for inclusion. Studies that did not provide data on the total number of patients or discs injected, or the number of cases of discitis, were excluded.

Data abstraction and synthesis

Data abstraction was conducted by two independent assessors (SGK, JH). The demographic variables collected from each study were age and gender. Tabulated clinical data included the total number of patients; total number of discograms; presence of diabetes or other comorbidities, whether or not prophylactic antibiotics were used; and the number of patients and discs infected.

Evaluation of quality of primary studies

The quality of the primary studies was rated using validated tools. The STROBE [30] guidelines were used to score case control studies. Each item was rated on a 0 (absent) to1 (present) categorical scale, with the total score obtained by the addition of individual component scores. Case series were similarly scored using the Yang recommendations [31].

Statistical analysis

Analysis was performed using primary data to calculate the incidence of discitis per patient and per disc. This was calculated by dividing the number of cases of discitis by the total number of patients or discs. Because the higher likelihood of encountering adverse events in a large population, subgroup analysis of studies with greater than 1,000 subjects was performed in an attempt to obtain a more accurate representation of the incidence in this cohort. All analyses were done using Excel 2004.

Results

Study selection

The search results and selection of studies are summarized in a flow diagram depicted in the Figure. The initial search identified 2,944 articles, among which 2,934 were excluded for failure to meet inclusion criteria (2,687 were not related to cervical discography, 229 were duplicate studies, and 18 had missing data). Four additional studies were obtained by a manual bibliographic search of the electronically identified articles, yielding 14 studies for analysis.

Study characteristics

The baseline characteristics of included studies are shown in Table 1. Large disparities were noted in the size of the studies, which ranged between 16 and 2,085 patients. Demographic information and procedural details (eg, number of levels, use of antibiotics) on the respective patient populations were missing from a majority of reports. In

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