ORIGINAL ARTICLE

Comparison of 3 Needle Sizes for Trigger Point Injection in Myofascial Pain Syndrome of Upper- and Middle-Trapezius Muscle: A Randomized Controlled Trial

Seung-Hyun Yoon, MD, PhD, Ueon Woo Rah, MD, PhD, Seung Soo Sheen, MD, MS, Kye Hee Cho, MD

ABSTRACT. Yoon S-H, Rah UW, Sheen SS, Cho KH. Comparison of 3 needle sizes for trigger point injection in myofascial pain syndrome of upper- and middle-trapezius muscle: a randomized controlled trial. Arch Phys Med Rehabil 2009;90:1332-9.

Objectives: To investigate (1) the relation between needle diameter and treatment efficacy of myofascial pain syndrome and (2) the relation between needle diameter and pain intensity during injection.

Design: Randomized controlled trial.

Setting: University-affiliated tertiary-care hospital.

Participants: Volunteers (N=77) with myofascial pain syndrome affecting upper- and middle-trapezius muscles with at least 3 months' duration of pain.

Intervention: Participants were randomly assigned to receive trigger point injections on 1 side of the trapezius with a 21-, 23-, or 25-gauge needle. After a 1-time injection, participants were followed up for 14 days. Participants and the assessor were blinded for group assignment.

Main Outcome Measures: Treatment efficacy was measured with the visual analog scale (VAS; at pretreatment, and posttreatment on days 1, 4, 7, 14) for neck and upper-back pain, the Neck Disability Index (NDI; at pretreatment, and posttreatment on days 7, 14), and the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36, at pretreatment and posttreatment on days 7, 14) for health-related quality of life. Pain intensity during injection was evaluated immediately after injection with VAS.

Results: VAS scores for posttreatment on days 4, 7, and 14 decreased significantly compared with pretreatment scores in all groups; NDI scores on days 7 and 14 decreased significantly compared with pretreatment scores in all groups; SF-36 scores on days 7 and 14 decreased significantly compared with pretreatment scores in the 21- and 23-gauge needle groups; and SF-36 score on day 14 showed significant difference between the 21- and 25-gauge needle groups. For pain intensity during injection, VAS scores indicated no significant difference between the 3 groups.

Conclusions: No difference between the needle types was observed in terms of VAS or NDI, or in terms of pain intensity felt by patients during injection. In terms of SF-36 scores, injections with 21- or 23-gauge needles were found to be more effective. However, a well-controlled investigation is needed to explore the effect of needle thickness on health-related quality of life.

Key Words: Injections; Myofascial pain syndromes; Neck pain; Quality of life; Rehabilitation.

MYOFASCIAL PAIN IS pain that derives from myofascial trigger points, which are small, highly sensitive areas in muscle that are characterized by hypersensitive, palpable, taut bands of muscle that are painful to palpation, reproduce the patient's symptoms, and cause referred pain.[1,2] Several methods have been recommended for the inactivation of trigger points. The treatments commonly used for this purpose are injection or dry needling.[3] The trapezius is probably the muscle that most often experiences myofascial trigger points,[1] and it is a frequently overlooked source of temporal[4] and cervicogenic[5] headaches. Clinically, the boundary between the upper- and middle-trapezius is frequently indistinguishable by palpation and is defined only by the locations of the attachment of fibers in relation to spinous processes, the scapular spine, acromion, and clavicle.[1]

Because no high-quality evidence is available about the efficacy of differently sized needles for trigger point injection, physicians have based needle selection on experience and not on scientific evidence. In some textbooks[1,6] and in a review article[7] on trigger point injection, thick needles (21 or 22 gauge) have been recommended for administering injections to superficial muscles such as the trapezius because although a needle with a smaller diameter may cause less discomfort, it is likely to provide neither the required mechanical disruption of a trigger point nor adequate sensation to the physician when overlying skin, subcutaneous skin, and subcutaneous tissue are penetrated.[1,7] Smaller-gauge needles may also be deflected from a taut muscular band and thus may not penetrate a trigger point.[7] Nevertheless, many studies on trigger point injection in patients with myofascial pain syndrome of neck and shoulder have used a smaller diameter 25-gauge needle.[8-12]

In the present study, we selected 3 differently sized needles to determine whether different needle thicknesses affect treatment efficacy and pain intensity. Accordingly, the purpose of this study was to determine the best needle size in terms of

List of Abbreviations

ANOVA	analysis of variance
LTR	local twitch response
NDI	Neck Disability Index
SF-36	Medical Outcomes Study 36-Item Short-Form Health Survey
VAS	visual analog scale

From the Department of Physical Medicine and Rehabilitation, Ajou University School of Medicine (Yoon, Rah, Cho); and Section of Clinical Epidemiology and Biostatistics in Clinical Trial Center (Sheen), Ajou University Medical Center, Suwon, Republic of Korea.

No commercial party having a direct financial interest in the results of the research supporting this article has or will confer a benefit on the authors or on any organization with which the authors are associated.

Reprint requests to Seung-Hyun Yoon, MD, PhD, Dept of Physical Medicine and Rehabilitation, Ajou University School of Medicine, San 5, Wonchon-dong, Yeongtong-gu, Suwon 443-721, Republic of Korea, e-mail: *yoonsh@ajou.ac.kr, shyhome@hanmail.net*.

0003-9993/09/9008-00904$36.00/0
doi:10.1016/j.apmr.2009.01.028

treatment efficacy and pain intensity during trigger point injection in myofascial pain syndrome of upper- and middle-trapezius muscle. We hypothesized that thicker needles (1) are more effective at treating myofascial pain syndrome, and (2) induce more severe pain during injection.

METHODS

Participants

Between April 17 and May 28, 2008, eligible participants between 20 and 70 years of age with pain in the posterior neck and upper back were recruited by displaying posters in a university-affiliated tertiary-care hospital in Suwon, Korea.

The required sample size was determined by power analysis on the basis of a previous study.[13] The SD of VAS score was assumed to be 20. Power calculations indicated that detecting a 20% difference in improvement in VAS score between 3 groups (with α=.05 and β=.10) would require a sample of 22 subjects for each group. To account for dropouts, 28 subjects were recruited for each group.

Study Design and Randomization

An intention-to-treat format and a randomized controlled design were adopted; the assessor (K.H.C.) was blinded to subject group allocations. A schematic of the study is shown in figure 1. A total of 115 subjects were recruited. Of these, 31 were excluded, 29 because they met exclusion criteria and the remaining 2 because of refusal. Screening evaluations, including the diagnosis of myofascial pain syndrome, were performed by one of the authors (S.H.Y.). After screening evaluations, 84 participants were randomly assigned to 1 of 3 groups by a block randomization method, which ensured that approximately equal numbers were allocated to each group.[14] A computerized random number generator and table[a] were used to perform group allocations, which was managed by another author (U.W.R.).

Inclusion and Exclusion Criteria

Inclusion criteria were: (1) participants with myofascial pain syndrome affecting the upper- and/or middle-trapezius muscles with posterior neck and/or upper-back pain, (2) a duration of pain of at least 3 months, (3) pain of moderate to severe intensity, defined as a score of 30 points or more on an ordinal self-rating pain scale rated from 0 (no pain) to 100 (worst imaginable pain). Exclusion criteria were: (1) receiving anticoagulant medication, (2) receiving an antiplatelet agent within 3 days before study commencement, (3) having pain related to trauma within 6 months of this study commencement, (4) receiving a trigger point injection within 3 months of this study in the same region, (5) receiving posterior neck and upper-back

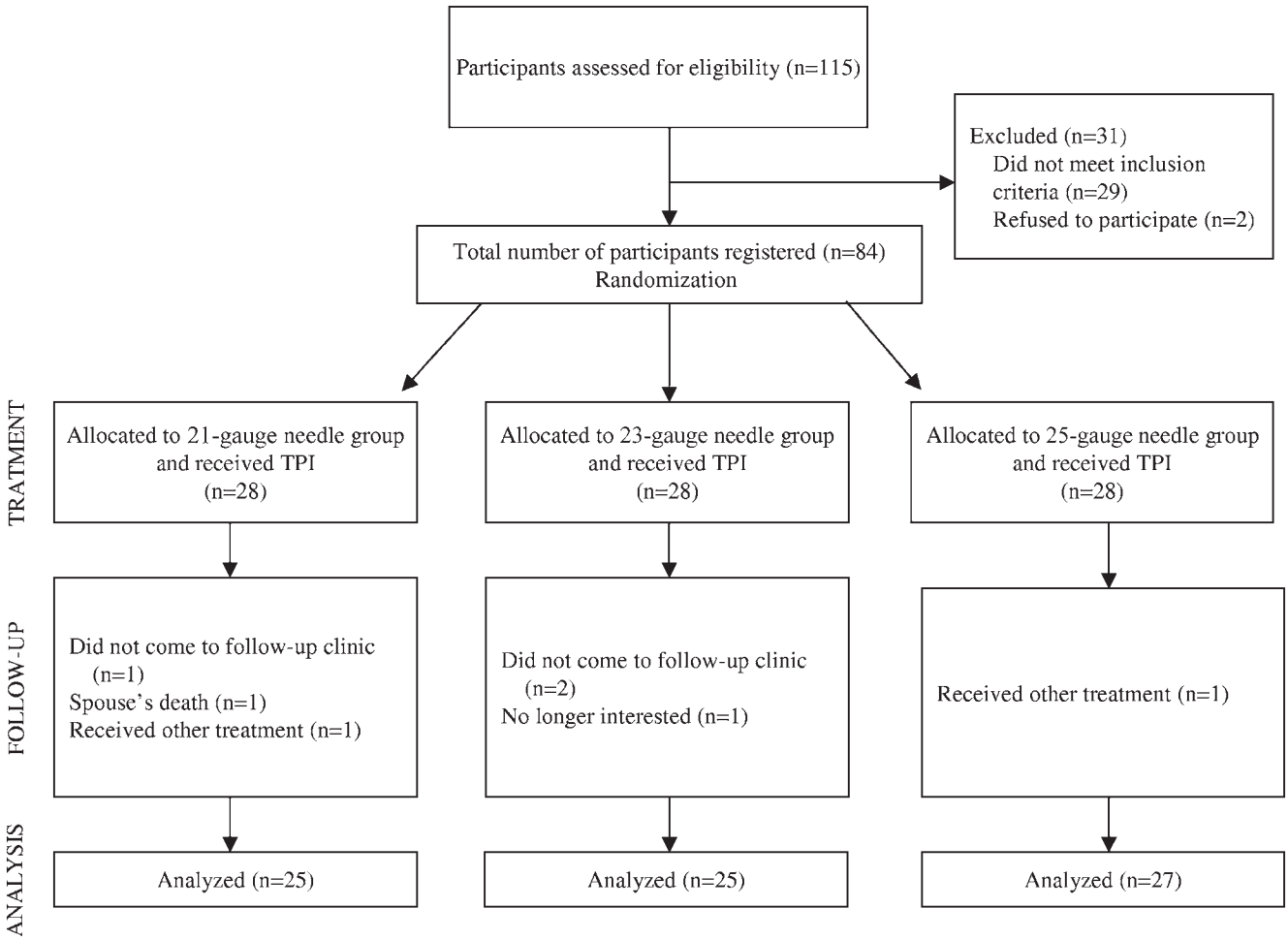

Fig 1. Consolidated Standards of Reporting Trials flow chart of the study. TPI, trigger point injection.