Are the Physical Therapeutic Modalities Really Safe?

Fizik Tedavi Modaliteleri Gerçekten Güvenli mi?

Berna TANDER, Ferhan CANTÜRK, Kıvanç CENGİZ, Dilek DURMUŞ, Yeşim AKYOL
Ondokuz Mayıs Üniversitesi Tıp Fakültesi Fiziksel Tıp ve Rehabilitasyon Anabilim Dalı, Samsun

Summary

Objective: The aim of this study was to evaluate the complications of physical therapeutic modalities (PTMs) and patient satisfaction during and after physical therapy (PT) in our institution.
Materials and Methods: One hundred consecutive patients (64 female, 36 male), who underwent PT were enrolled in this study. A questionnaire involving demographic data, complications of PTMs and complaints of patients was applied to all patients. PTMs and patient numbers were as follows; hot pack for 86 patients, ultrasound for 69, interferential current for 56, diadynamic electrotherapy for 37, short wave diathermy for 26, whirlpool for 5 and cold pack for 2 patients. The patients' disorders were as follows respectively; 44 patients had lumbar or cervical spondylosis, 18 knee osteoarthritis, 15 soft tissue disease, 14 shoulder periarthritis, 9 cerebrovascular disease and 6 joint contractures.
Results: The mean age was 51.14±13.42 years. Pain (n=4), tachycardia (n=2), bleeding (n=1), allergic reaction (n=1), hypertension (n=1) and bulla (n=1) were documented as PTMs complications. There was no statistically significant relationship between the occurrence of complications and patients' satisfaction (p>0.05). We did not find any significant relationship between the primary disorders and the complications, and PTMs and the complications (p>0.05).
Conclusion: The PTMs are safe and did not raise serious complications when used by experienced physiotherapists. Patients were satisfied with their therapy as well. *Turk J Phys Med Rehab 2005;51(4):131-133*
Key Words: Physical therapeutic modalities, complication, physical therapy, patients' satisfaction

Özet

Amaç: Bu çalışmanın amacı; kliniğimizde yatırılarak fizik tedavi modaliteleri (FTM) uygulanan hastalarda, uygulama sırasında veya sonrasında FTM'nin komplikasyonlarını ve hastaların memnuniyetlerini saptamaktı.
Gereç ve Yöntem: Çalışmaya kliniğimizde yatırılarak tedaviye alınan 100 hasta (64 kadın, 36 erkek) dahil edildi. Bütün hastalara demografik verileri, FTM'nin komplikasyonlarını ve hastaların memnuniyetlerini ölçen bir form uygulandı. Hastalara uygulanan FTM'leri sırasıyla; 86 hot pack, 69 ultrason, 56 interferansiyel akım, 37 diadinamik akım, 26 kısa dalga diatermi, 5 whirlpool (girdaplı banyo) ve 2 soğuk uygulama idi. Tanılar; 44 servikal veya lomber spondiloz, 16 gonartroz, 14 omuz periartriti, 11 yumuşak doku lezyonu, 9 serebrovasküler hastalık ve 6 eklem kontraktürü idi.
Bulgular: Hastaların yaş ortalaması 51,14±13,42 yıl idi. Dört hastada ağrı, ikisinde taşikardi, birer hastada da hipertansiyon, uygulama yerinde kanama, alerjik reaksiyon ve bül oluşumu kaydedildi. Hastaların memnuniyetleri ile komplikasyonlar arasında ilişki saptanmadı (p>0,05). Ayrıca primer hastalık-komplikasyonlar ve FTM-komplikasyonlar arasında da bir ilişki bulamadık (p>0,05).
Sonuç: FTM güvenli bulundu ve ciddi komplikasyonlara yol açmadılar. Fizik tedavi uygulanan hastalar da tedaviden memnun olduklarını belirttiler. *Türk Fiz Tıp Rehab Derg 2005;51(4):131-133*
Anahtar Kelimeler: Fizik tedavi modaliteleri, komplikasyon, fizik tedavi, hasta memnuniyeti

Introduction

Several types of physical therapy modalities (PTMs) are used in the management of painful musculoskeletal disorders. These treatment modalities are categorized as electrotherapy modalities, thermal modalities, manual therapies and exercises (1). Physical agents such as cold, heat, massage etc. have been commonly used as therapeutic modalities for many disorders for decades of years (2,3). PTMs are being used for functional and metabolic regulation, relief of pain and restriction, maintenance of functional independency of locomotor system disorders. Interestingly, their complications and patients' satisfaction have not been investigated and published in details yet. There are only some case reports regarding the complications of PTMs (4-7).

Yazışma adresi: Dr. Berna Tander-Ondokuz Mayıs Üniversitesi Tıp Fakültesi Fiziksel Tıp ve Rehabilitasyon Anabilim Dalı, 55139 Kurupelit-Samsun
Tel: 0362-4576000/2654 Faks: 0362-4576041 e-posta: tander@omu.edu.tr **Kabul Tarihi:** Kasım 2005
Note: 5th Mediterranean Congress of Physical and Rehabilitation Medicine'de poster olarak sunulmuştur.

Türk Fiz Tıp Rehab Derg 2005;51(4):131-133
Turk J Phys Med Rehab 2005;51(4):131-133

The aim of this study was to evaluate the complications of PTMs, and the outcomes of patients' complaints in a particular group of patients, who have received physical therapy in our institution.

Materials and Methods

One hundred consecutive patients, who underwent physical therapy between August 2003 and February 2004, were enrolled in this study. Approval for the study was obtained from the local Ethics Committee. One hundred inpatient subjects were participated in this study. They filled a questionnaire before and after the application of PTMs. Age, sex, height, weight, job, marital status, prior complaints and changes of complaints were recorded. The respondents were also asked to determine any complications resulting from the use of physical agents. The disorders of the patients were as follows respectively; 44 lumbar or cervical spondylosis, 18 knee osteoarthritis, 15 soft tissue disease, 14 shoulder periarthritis, 9 cerebrovascular diseases and 6 joint contractures.

Hot pack was applied to the back or neck region over a thin towel for 20 minutes. Cold pack was applied to the neck for 15 minutes. Ultrasound (Sonopuls 434, Enraf Nonius, The Nederland) was applied by moving the applicator over the treated area in slow (1 to 2 cm/sec) overlapping strokes. The treatment area was cleaned before treatment and a coupling agent was necessary. Also interference current therapy (Endomed-M 433), short wave diathermy (Curapuls 419, Enraf Nonius, The Nederland), diadynamic electrotherapy (Dynatron 438, Enraf Nonius, The Nederland) and whirlpool (Pulsaerator 445) were used for some disorders. In ten patients, a single PTM was applied but 90 patients received combined PTMs.

Some patients received oral paracetamol, when needed during the therapy. The physiotherapists who applied the PTMs were unaware of the primary pathologies, clinical course and final outcome of the patients. Furthermore, the physiatrist who was responsible for the care of the patient did not supervise the application of PTMs. All of the patients were examined for the possible complications just after and the day after the application of PTMs. The patients were asked about any complications of PTMs. So the complications of PTMs were either objectively investigated by the physiatrists and/or subjectively expressed by the patient.

At the end of the physical therapy, the patients were asked about their complaints. They responded that their complaints were either totally or partially relieved or same as before or increased.

Statistical analysis was performed to evaluate the numbers and the types of complications for different modalities using Chi-square test, Fisher's exact test, Mann-Whitney U test and Kruskal-Willis variance analysis where appropriate, by using SPSS version 10.0 for Windows. Also the descriptive analysis was made to find out the mean values and standard deviations of different factors of the patients. For these tests, differences with $p<0.05$ were considered significant.

Results

A total of one hundred patients (62 female, 38 male) were included in the study. The mean age was 51.14±13.42 years. Patients' demographic characteristics are shown in the Table 1. When the occupation of the patients was considered, we found that 52% of the patients were house-wife, 15% were retired, 19% were employee, and 10% were workers. Sixty-three percent of the patients had not received any PTMs prior to the current study. Fig. 1 shows the number of the PTMs which were used.

Complications were seen in 10 patients (10%) (Fig. 2 and Fig. 3). At the end of therapy, 6 patients were very satisfied with the-

Table 1: Demographic Characteristics of Subjects.

	Mean±SD (Range)
Age (years)	51.14±13.42 (14-83)
Sex (female/male)	62/38
Weight (kg)	73.50±14.40 (38-110)
Height (cm)	164.41±8.13 (150-187)
Body mass index (kg/m^2)	27.36±4.85 (14-40)
Main duration of physical therapy (days)	12.64±3.95 (10-32)

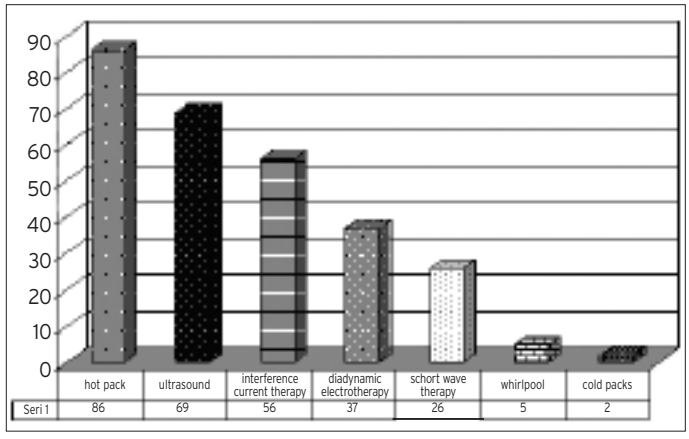

Figure 1: Number of physical therapy modalities.

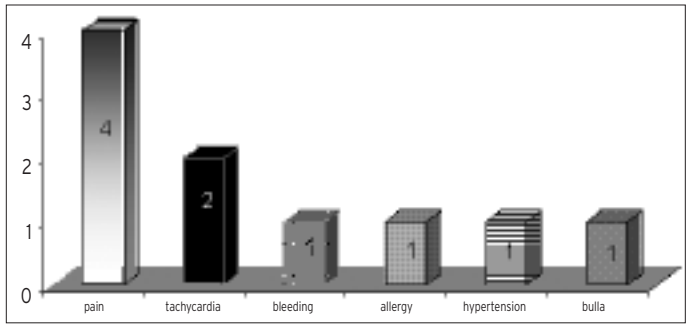

Figure 2: Complications of physical therapy modalities.

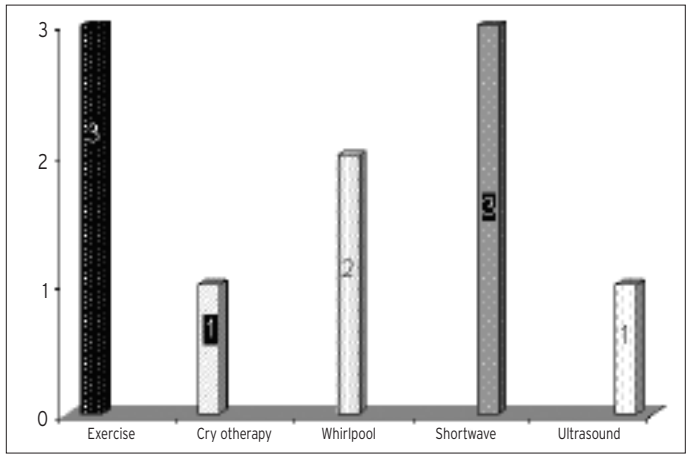

Figure 3: Number of complications after physical therapy modalities.

in treatment with PTMs. Seventy-eight patients expressed diminished complaints, whereas the complaints were not changed in 15 cases and increased in 1 patient.

There were no statistically significant relationship between demographic data, primary disorders, PTMs and development of complications (p>0.05). There was no statistically significant relationship between occurrence of complications and patients' satisfaction either (p>0.05). We did not find any significant relationship between the primary disorders and complications and between the therapeutic modalities and the complications (p>0.05).

Discussion

PTMs such as heat, cold, electrical stimulation, laser and magnetic field etc. are useful therapies for the functional and metabolic improvement and for the relief of pain and stiffness of the locomotor disorders (1).

Appropriate PTM selection is influenced by multiple factors. In choosing a PTM one should recognize that there are few well-designed clinical trials demonstrating the efficacy of specific modalities in specific conditions. Diathermy refers to several forms of deep heating namely shortwave, microwave and ultrasound. Interferential current therapy is a modality that utilizes two alternating current signals of slightly different frequency. Whirlpool use water to produce convective heating or cooling massage and gentle debridement. Shortwave diathermy conversively heats tissue by exposing it radio waves produced by a machine that is essentially a shortwave radio (1,2).

Despite their wide usage, there is only some case reports related to complications of these modalities in peer-reviewed journals. Recently Batavia (8) suggested that there is no universally accepted agreement on the contraindications of some PTMs. Although the complications of PTMs are very well known by physiatrists and physiotherapists, it is very interesting that almost no controlled prospective studies evaluating the complications of the therapeutic modalities which are used in everyday practice were done.

Nadler et al. (9) were aware of this fact and they investigated the complications of therapeutic modalities, which were encountered by athletic trainers during their practice by using a questionnaire. However their study was not a prospective trial and only 30% of the athletic trainers enrolled in the study, have responded the questionnaire. This may have some negative influences on the reliability of the results. Because of the lack of prospective studies, we evaluated the complications of PTMs in one hundred patients in a prospective manner.

Complications of PTMs were documented in Fig 2. Increase in pain was mentioned by three patients after exercise therapy and by one patient after cryotherapy. According to Nadler et al. (9), pain was the most common problem occurring after the application of therapeutic exercise, as also seen in our study. Bleeding and bulla occurred in two patients after whirlpool therapy. Deep heaters (shortwave and ultrasound) caused tachycardia and hypertension in three patients. Gel used in ultrasound therapy caused allergic reaction (contact dermatitis) in one patient.

Collins et al. (10), Drez et al. (11) and Moeller et al. (12) reported nerve palsies due to cryotherapy. Contact dermatitis due to the gel used in ultrasound therapy was also reported (13-15). Castelain et al. (16) found contact dermatitis after transcutaneous electric analgesia. The most common complication after the PTMs was temporary pain on the application site. However the patients did not complain about these complications of the PTMs when the overall effect of the therapy program was considered. The other complications such as allergy and bleeding were also temporary and each occurred only in 1% of the patients.

We also investigated the patients' complaints at the end of the therapy program. We found that 84% of the patients were satisfied with their therapy, (6 reported that they were no more complaints at all and 78 mentioned that their complaints were diminished). Complaints of 15% (n=15) of the patients did not change and one (1%) patient reported increase in the complaints after the physical therapy program.

The main limitations of the current study are the absence of a control group who received a placebo. However it may produce many ethical problems to applied only placebo to patients with pain. Furthermore, there is no common and accepted measurement method which determines patients' satisfactions. This is another drawback of the study.

In our institution, PTMs are being applied by expert physiotherapists. We think that this is reason that we have seen so few complications after the PTMs. We therefore suggest that the PTMs are very efficient and safe treatment methods in experienced hands. To the best of our knowledge, this is the first prospective study in the peer-reviewed literature which investigated the complications of PTMs in a series of patients. We hope that, people who are dealing with PTMs are more aware about their complications. Further investigations are needed in greater number of patients especially after use of different therapeutic modalities. In the future, randomized controlled trials may add new insight to our knowledge about the safety and effectiveness of the PTMs.

References

1. Weber DC, Brown A. Physical agents modalities, In: Braddom RL, editor. Physical Medicine and Rehabilitation 2nd ed. Philadelphia: W. B. Saunders; 2000. p. 440-5.
2. Basford JR. Physical agents, In: DeLisa J, Gans BM, editors. Rehabilitation Medicine: Principles and Practices. 3rd ed. Philadelphia: Lippincott-Raven; 1998. p. 483-99.
3. Bissell JH. Therapeutic modalities in hand surgery. J Hand Surg 1999;24:435-48.
4. Sandanam J. Burns caused by heating pads (letter). Med J Aust 1982;1(9):369.
5. Stevenson TR, Hammond DC, Keip D, Argenta LC. Heating pad burns in anesthetic skin. Ann Plast Surg 1985;15:73-5.
6. Khabbaz RF, McKinley TW, Goodman RA, Hightower AV, Highsmith AK, Tait KA, et al. Pseudomonas aeruginosa serotype 0:9 new case of whirlpool associated dermatitis. Am J Med 1983;74:73-7.
7. Bassett FH, Kirkpatrick JS, Engelhardt DL, Malone TR. Cryotherapy induced nerve injury. Am J Sports Med 1992;20:516-8.
8. Batavia MB. Contraindications for superficial heat and therapeutic ultrasound: Do sources agree? Arch Phys Med Rehabil 2004;85:1006-12.
9. Nadler SF, Prybicien M, Malanga GA, Sicher D. Complications from therapeutic modalities: Results of a national survey of athletic trainers, Arch Phys Med Rehabil 2003;84:849-63.
10. Collins K, Storey M, Peterson K. Peroneal nerve palsy after cryotherapy. Phys Sport Med 1986;14:105-8.
11. Drez D, Faust DC, Evans JP. Cryotherapy and nerve palsy. Am J Sports and Med 1981;9(4):256-7.
12. Moeller JL, Monroe J, McKeag DB. Cryotherapy-induced common peroneal nerve palsy. Clin J Sport Med 1997;7(3):212-6.
13. Eguino P, Sanchez A, Agesta N, Lasa O, Raton JA, Diaz-Perez JL. Allergic contact dermatitis due to propylene glycol and parabens in an ultrasonic gel. Contact Dermatitis 2003;48(5):290.
14. Erdmann SM, Sachs B, Merk HF. Allergic contact dermatitis due to methyldibromo glutaronitrile in Euxyl K 400 in an ultrasonic gel. Contact Dermatitis 2001;44(1):39-40.
15. Villa A, Venegoni M, Tiso B. Cases of contact dermatitis caused by ultrasonographic gel. J Ultrasound Med 1998;17(8):530.
16. Castelain PY, Chabeau G. Contact dermatitis after transcutaneous electric analgesia. Contact Dermatitis 1986;15:32-5.