ABOUT JCMR

The Journal of Clinical Medicine and Research (JCMR) is published monthly (one volume per year) by Academic Journals.

Journal of Clinical Medicine and Research (JCMR) is an open access journal that provides rapid publication (monthly) of articles in all areas of the subject such as cardiology, critical care medicine, Family Medicine, geriatrics, pediatrics etc.

The Journal welcomes the submission of manuscripts that meet the general criteria of significance and scientific excellence. Papers will be published shortly after acceptance. All articles published in JCMR are peer-reviewed.

Submission of Manuscript

Submit manuscripts as e-mail attachment to the Editorial Office at: jcmr@academicjournals.org. A manuscript number will be mailed to the corresponding author shortly after submission.

For all other correspondence that cannot be sent by e-mail, please contact the editorial office (at jcmr@academicjournals.org).

The Journal of Clinical Medicine and Research will only accept manuscripts submitted as e-mail attachments.

Please read the Instructions for Authors before submitting your manuscript. The manuscript files should be given the last name of the first author.
Editors

Prof. Neveen Helmy Ahmed Aboelsoud,
Complementary Medicine Researches & Applications (CAM),
National Research Center,
Research St (Tahrir),
Dokki ,Cairo,
Egypt.

Prof. Bodh Raj Panhotra,
Department of Medical Microbiology,
Medical Laboratory Technology & Clinical Sciences,
Sardar Bhagwan Singh Postgraduate Institute of Biomedical Sciences & Research,
Balawala, Dehradun,
India.

Editorial Board

Prof. Ahmed B Hammam,
King Saud University,
Saudi Arabia.

Dr. Ellen Rosskam,
Senior Scholar, Woodrow Wilson International Center for Scholars,
Washington, D.C.,
Adjunct Professor, University of Massachusetts, Lowell,
Visiting Senior Fellow, University of Surrey,
Faculty of Health and Medical Sciences, England,
Switzerland.

Dr. Philippe Connes,
National Institute of Health and Medical Research (763),
Academic Hospital of Pointe a Pitre,
Guadeloupe (French West Indies),
Guadeloupe.

Dr. Robert G Bota,
University of Missouri,
Kansas City,
USA.

Dr. Haiyang Zhou,
Department of General Surgery,
Changzheng Hospital,
Second Military Medical University.
China.

Dr. Jimmy Jose,
SAC College of Pharmacy, Karnataka,
India.

Dr. Carlos A. Feldstein,
Hospital de Clinicas Jose de San Martin,
Av. Cordoba 2351 Buenos Aires 1120,
Argentina.

Dr. Fadia Mostafa Attia,
Faculty of Medicine,
Suez Canal University,
Egypt.

Dr. Hamza Mujagic,
Massachusetts General Hospital,
USA.

Dr. O.U.J. Umeora,
Ebonyi State University/Teaching Hospital,
Nigeria.
Instructions for Author

Electronic submission of manuscripts is strongly encouraged, provided that the text, tables, and figures are included in a single Microsoft Word file (preferably in Arial font).

The cover letter should include the corresponding author’s full address and telephone/fax numbers and should be in an e-mail message sent to the Editor, with the file, whose name should begin with the first author’s surname, as an attachment.

Article Types
Three types of manuscripts may be submitted:

Regular articles: These should describe new and carefully confirmed findings, and experimental procedures should be given in sufficient detail for others to verify the work. The length of a full paper should be the minimum required to describe and interpret the work clearly.

Short Communications: A Short Communication is suitable for recording the results of complete small investigations or giving details of new models or hypotheses, innovative methods, techniques or apparatus. The style of main sections need not conform to that of full-length papers. Short communications are 2 to 4 printed pages (about 6 to 12 manuscript pages) in length.

Reviews: Submissions of reviews and perspectives covering topics of current interest are welcome and encouraged. Reviews should be concise and no longer than 4-6 printed pages (about 12 to 18 manuscript pages). Reviews are also peer-reviewed.

Review Process
All manuscripts are reviewed by an editor and members of the Editorial Board or qualified outside reviewers. Authors cannot nominate reviewers. Only reviewers randomly selected from our database with specialization in the subject area will be contacted to evaluate the manuscripts. The process will be blind review. Decisions will be made as rapidly as possible, and the journal strives to return reviewers’ comments to authors as fast as possible. The editorial board will re-review manuscripts that are accepted pending revision. It is the goal of the JCMR to publish manuscripts within weeks after submission.

Regular articles
All portions of the manuscript must be typed double-spaced and all pages numbered starting from the title page.

The Title should be a brief phrase describing the contents of the paper. The Title Page should include the authors’ full names and affiliations, the name of the corresponding author along with phone, fax and E-mail information. Present addresses of authors should appear as a footnote.

The Abstract should be informative and completely self-explanatory, briefly present the topic, state the scope of the experiments, indicate significant data, and point out major findings and conclusions. The Abstract should be 100 to 200 words in length. Complete sentences, active verbs, and the third person should be used, and the abstract should be written in the past tense. Standard nomenclature should be used and abbreviations should be avoided. No literature should be cited. Following the abstract, about 3 to 10 key words that will provide indexing references should be listed.

A list of non-standard Abbreviations should be added. In general, non-standard abbreviations should be used only when the full term is very long and used often. Each abbreviation should be spelled out and introduced in parentheses the first time it is used in the text. Only recommended SI units should be used. Authors should use the solidus presentation (mg/ml). Standard abbreviations (such as ATP and DNA) need not be defined.

The Introduction should provide a clear statement of the problem, the relevant literature on the subject, and the proposed approach or solution. It should be understandable to colleagues from a broad range of scientific disciplines.

Materials and methods should be complete enough to allow experiments to be reproduced. However, only truly new procedures should be described in detail; previously published procedures should be cited, and important modifications of published procedures should be mentioned briefly. Capitalize trade names and include the manufacturer's name and address. Subheadings should be used. Methods in general use need not be described in detail.
Results should be presented with clarity and precision. The results should be written in the past tense when describing findings in the authors’ experiments. Previously published findings should be written in the present tense. Results should be explained, but largely without referring to the literature. Discussion, speculation and detailed interpretation of data should not be included in the Results but should be put into the Discussion section.

The Discussion should interpret the findings in view of the results obtained in this and in past studies on this topic. State the conclusions in a few sentences at the end of the paper. The Results and Discussion sections can include subheadings, and when appropriate, both sections can be combined.

The Acknowledgments of people, grants, funds, etc. should be brief.

Tables should be kept to a minimum and be designed to be as simple as possible. Tables are to be typed double-spaced throughout, including headings and footnotes. Each table should be on a separate page, numbered consecutively in Arabic numerals and supplied with a heading and a legend. Tables should be self-explanatory without reference to the text. The details of the methods used in the experiments should preferably be described in the legend instead of in the text. The same data should not be presented in both table and graph form or repeated in the text.

Figure legends should be typed in numerical order on a separate sheet. Graphics should be prepared using applications capable of generating high resolution GIF, TIFF, JPEG or Powerpoint before pasting in the Microsoft Word manuscript file. Tables should be prepared in Microsoft Word. Use Arabic numerals to designate figures and upper case letters for their parts (Figure 1). Begin each legend with a title and include sufficient description so that the figure is understandable without reading the text of the manuscript. Information given in legends should not be repeated in the text.

References: In the text, a reference identified by means of an author’s name should be followed by the date of the reference in parentheses. When there are more than two authors, only the first author’s name should be mentioned, followed by ‘et al.’. In the event that an author cited has had two or more works published during the same year, the reference, both in the text and in the reference list, should be identified by a lower case letter like ‘a’ and ‘b’ after the date to distinguish the works.

Examples:

Nishimura (2000), Agindotan et al. (2003), (Kelebeni, 1983), (Usman and Smith, 2001), (Chege, 1998; Stein, 1987a,b; Tijani, 1993,1995), (Kumasi et al., 2001)

References should be listed at the end of the paper in alphabetical order. Articles in preparation or articles submitted for publication, unpublished observations, personal communications, etc. should not be included in the reference list but should only be mentioned in the article text (e.g., A. Kingori, University of Nairobi, Kenya, personal communication). Journal names are abbreviated according to Chemical Abstracts. Authors are fully responsible for the accuracy of the references.

Examples:


Case Studies

Case Studies include original case reports that will deepen the understanding of general medical knowledge.

The Title should be a brief phrase describing the contents of the paper. The Title Page should include the authors' full names and affiliations, the name of the corresponding author along with phone, fax and E-mail information. Present addresses of authors should appear as a footnote.

The Abstract should be informative and completely self-explanatory, briefly present the topic, state the scope of the experiments, indicate significant data, and point out major findings and conclusions. The Abstract should be 100 to 200 words in length. Complete sentences, active verbs, and the third person should be used, and the abstract should be written in the past tense. Standard nomenclature should be used and abbreviations should be avoided. No literature should be cited.

Following the abstract, about 3 to 10 key words that will provide indexing references should be listed.

A list of non-standard Abbreviations should be added. In general, non-standard abbreviations should be used only when the full term is very long and used often. Each abbreviation should be spelled out and introduced in parentheses the first time it is used in the text. Only recommended SI units should be used. Authors should use the solidus presentation (mg/ml).

The Introduction should provide a clear statement of the problem, the relevant literature on the subject, and the proposed approach or solution. It should be understandable to colleagues from a broad range of scientific disciplines. The presentation of the case study should include the important information regarding the case. This must include the medical history, demographics, symptoms, tests etc. Kindly note that all information that will lead to the identification of the particular patient(s) must be excluded.

The conclusion should highlight the contribution of the study and its relevance in general medical knowledge.

The Acknowledgments of people, grants, funds, etc should be brief.

References: Same as in regular articles

Short Communications

Short Communications are limited to a maximum of two figures and one table. They should present a complete study that is more limited in scope than is found in full-length papers. The items of manuscript preparation listed above apply to Short Communications with the following differences: (1) Abstracts are limited to 100 words; (2) instead of a separate Materials and Methods section, experimental procedures may be incorporated into Figure Legends and Table footnotes; (3) Results and Discussion should be combined into a single section.

Proofs and Reprints: Electronic proofs will be sent (e-mail attachment) to the corresponding author as a PDF file. Page proofs are considered to be the final version of the manuscript. With the exception of typographical or minor clerical errors, no changes will be made in the manuscript at the proof stage. Because JIMMS will be published freely online to attract a wide audience, authors will have free electronic access to the full text (in both HTML and PDF) of the article. Authors can freely download the PDF file from which they can print unlimited copies of their articles.
Fees and Charges: Authors are required to pay a $550 handling fee. Publication of an article in the Journal of Clinical Medicine and Research is not contingent upon the author’s ability to pay the charges. Neither is acceptance to pay the handling fee a guarantee that the paper will be accepted for publication. Authors may still request (in advance) that the editorial office waive some of the handling fee under special circumstances.

Copyright: © 2012, Academic Journals.
All rights Reserved. In accessing this journal, you agree that you will access the contents for your own personal use but not for any commercial use. Any use and or copies of this Journal in whole or in part must include the customary bibliographic citation, including author attribution, date and article title.

Submission of a manuscript implies: that the work described has not been published before (except in the form of an abstract or as part of a published lecture, or thesis) that it is not under consideration for publication elsewhere; that if and when the manuscript is accepted for publication, the authors agree to automatic transfer of the copyright to the publisher.

Disclaimer of Warranties

In no event shall Academic Journals be liable for any special, incidental, indirect, or consequential damages of any kind arising out of or in connection with the use of the articles or other material derived from the JCMR, whether or not advised of the possibility of damage, and on any theory of liability.

This publication is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, the implied warranties of merchantability, fitness for a particular purpose, or non-infringement. Descriptions of, or references to, products or publications does not imply endorsement of that product or publication.

While every effort is made by Academic Journals to see that no inaccurate or misleading data, opinion or statements appear in this publication, they wish to make it clear that the data and opinions appearing in the articles and advertisements herein are the responsibility of the contributor or advertiser concerned. Academic Journals makes no warranty of any kind, either express or implied, regarding the quality, accuracy, availability, or validity of the data or information in this publication or of any other publication to which it may be linked.
ARTICLES

Research Articles

**Combined oral and vaginal misoprostol use in therapeutic terminations at 14 to 28 weeks of gestation**  
Murat Bozkurt  
104

**Correlation between clinical and magnetic resonance imaging (MRI) findings in temporomandibular disorders**  
Osama Samara, Azmy M. Hadidy, Emad S. Tarawneh, Nosaiba T Al Ryalat, Dina Haroun, Soukaina Ryalat  
109
Combined oral and vaginal misoprostol use in therapeutic terminations at 14 to 28 weeks of gestation

Murat Bozkurt

Taksim Education and Research Hospital, Gynecology and Obstetrics Department. Siraselviler Cad No. 112 Beyoğlu, 34433. Istanbul, Turkey. Tel: 902122524300-1204 -90532279072, Fax: 902122497804 E-mail: jindrmb@yahoo.com

Accepted 19 November, 2012

This study involved an investigation of the effectiveness and complications of oral and vaginal misoprostol use on the termination of second trimester pregnancies. A total of 103 cases were recruited from the medical records of the Gynecology and Obstetrics Clinic of Taksim Research and Training Hospital and Şırnak İdil State Hospital. Women underwent therapeutic termination of pregnancy between the 14 to 28th week of gestation using the defined combined misoprostol regimen. After the women were admitted, 200 μg vaginal (100 μg intracervical, 100 μg into the posterior fornix), 200 μg oral doses and 200 μg of sequential doses were administered in the 2nd and 4th hour. Subjects were excluded from the study if they were out of the defined gestational weeks using additional drugs with misoprostol; their data has not been recorded in detail.

Of the 103 cases, 86 had an abortion within 24 h and the mean expulsion time was calculated as 15.42 ± 7.14 h (min 6.39 to max 20.03) in this group. The success rate for the 24 h was found to be 83.4%. Six more cases had an abortion when the second dose was given. The mean expulsion time was found to be 9.31 ± 3.26 h (min 6.45 to max 13.21) for the second 24 h. The success rate over 48 h rose to 89.3%. The total expulsion time was 18.30 ± 8.74 h. There was a history of previous caesarean sections in 2 out of 11 cases that did not have an abortion and one of these cases underwent a hysterotomy. The pregnancy was terminated by evacuation and curettage, as abortion did not occur despite 3 different high dose misoprostol regimens as in the other cases. Pregnancies of the remaining 9 cases were terminated with different misoprostol doses, oxytocin infusion and the evacuation and curettage method. When complication rates were evaluated, analgesic requiring pain (18.4%) was the leading complication, followed by nausea (11.6%), fever (7.7%), headaches and dizziness (5.8%), transfusion-requiring haemorrhage (3.8%) and diarrhea (1.9%). Uterine rupture or death did not occur. A combined misoprostol regimen is relatively safe with acceptable side effects when used carefully for the termination of second trimester pregnancies.

Keyword: Misoprostol, Pregnancy Trimester. Second, Termination of Pregnancy, Mean Expulsion Time, Medical Termination, Vacuum Curettage, Side Effects

INTRODUCTION

Misoprostol (Cytotec 200 μg, Aris, Istanbul) is a synthetic prostaglandin E1 analogue approved by the FDA (Food and Drug Administration) with the aim of preventing the development of drug related peptic ulcer. It was first used for abortion purposes in 1988 in Brazil, after which it was used for first and second trimester pregnancy terminations, for induction of labor and in prevention and treatment of postpartum haemorrhage. Although it is effective, inexpensive, easily applicable and tolerable, it has some potential risks for the baby and the mother. Quite different doses and application types are available in the second trimester. Studies in the literature are limited in terms of case numbers and its use for abortion purposes has not yet been approved by the FDA.
Table 1. Mean age and gestational weeks.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age ± SD (year)</td>
<td>22.50±5.5</td>
</tr>
<tr>
<td>Mean gestational week ± SD (weeks)</td>
<td>20.39±6.39</td>
</tr>
</tbody>
</table>

Table 2. Distribution of cases according to gestational weeks.

<table>
<thead>
<tr>
<th>Period (weeks)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-18</td>
<td>31.06 (n:32)</td>
</tr>
<tr>
<td>19-22</td>
<td>26.21 (n:27)</td>
</tr>
<tr>
<td>23-26</td>
<td>34.95 (n:36)</td>
</tr>
<tr>
<td>27-28</td>
<td>7.76 (n:8)</td>
</tr>
</tbody>
</table>

Table 3. Obstetric histories of the cases.

<table>
<thead>
<tr>
<th>History</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nulliparous</td>
<td>43.7 (n:45)</td>
</tr>
<tr>
<td>Multiparous (previous vaginal delivery)</td>
<td>46.6 (n:48)</td>
</tr>
<tr>
<td>Previous caesarean section</td>
<td>9.7 (n:10)</td>
</tr>
</tbody>
</table>

MATERIALS AND METHODS

This study was conducted retrospectively in the Gynecology and Obstetrics Clinic of Taksim Research and Training Hospital in Istanbul and İdil State Hospital in Şırnak between 2003, January and 2009, September. A total of 103 cases between 14 to 28th gestational weeks who had undergone an abortion by using the defined misoprostol regime were included in the study. The misoprostol regimes were given in the hospital and the pregnant product expulsion was also in the hospital. The misoprostol regimen included a total of a 400 μg loading dose, composed of 200 μg vaginal (100 μg intracervical, 100 μg to the posterior fornix) and 200 μg oral misoprostol followed by sequential doses of 200 μg misoprostol administered through the oral route at the 2nd and 4th hours.

Vaginal misoprostol was soaked in saline solution and administered to the posterior fornix and intracervical region. Doses administered through the oral route were observed. The expulsion rate of this regimen at the 24th and 48th hours and complications were investigated. Pregnancy terminations using any other regime besides the one mentioned above were excluded from the study. Patients who received oxytocin infusion, whose cervical dilation was greater than 3 cm were excluded from the study. The gestational weeks of the patients were calculated based on the first day of the last menstrual period. The calculated gestational weeks were confirmed with ultrasonography. Ultrasonographic fetal biometry was taken account in patients whose replace incompatibility was with discrepancy. Expulsion rates were evaluated at the 24th and 48th hours. Fever, abdominal pain, nausea and vomiting, diarrhea and uterine rupture were evaluated as complications. All cases were performed using Bumm curettage after the placenta had been separated immediately. The uterus was evaluated in terms of placenta retention by transvaginal ultrasonography after curettage.

A first-generation cephalosporin antibiotic (Cephalazin Sodium, lessor 1 g IM, IE Ulugay) is used to avoid vaginal inflammation due to transvaginal ultrasonography. All patients were hospitalized at least 12 h after the procedure. Statistical analysis was done using the Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL, USA) program. Descriptive statistics were given as mean ± standard deviation for constant variables and in percentage for categorical variables.

RESULTS

The mean age of the 103 cases was 22.50 ± 5.5 years and the mean gestational week was 20.39 ± 6.39 (Table 1). Distribution of cases according to gestational weeks is shown in Table 2. Obstetric histories of the cases are given in Table 3. Expulsion numbers of the cases at 24 and 48 h are given in Table 4. Reasons for therapeutic termination and quantitative distribution are given in Table 5. Complications after the misoprostol regimen and rates are given in Table 6. Mean expulsion time interval between the fetus and placenta, mean fetal and placental weight, mean bleeding volume and mean menstruation recovery time are given in Table 7.

DISCUSSION

The use of medical methods has increased the termination of early pregnancies because of potential risks and complications of surgical methods (for example, incomplete abortion, uterine perforation and haemorrhage). One of the best studied prostaglandin analogues is misoprostol. The fact that it is stable at room temperature, inexpensive and easy of use has led to its being preferred rather than other analogues. Although misoprostol was first produced as an oral medication for use in the treatment of peptic ulcers, it may also be used for the termination of pregnancies through the intravaginal, intracervical, rectal and sublingual routes. However, there is no consensus regarding which route is better.

Second trimester abortions constitute 10 to 15% of all induced abortions and the availability of medical methods has increased the use of misoprostol regimens during recent 10 years (Lalitkumar et al., 2007). Accurate dosage and method are quite important in misoprostol use and while it may be ineffective in very low doses, complication rates may be high and complications may be severe in high doses. Especially combined misoprostol and mifepristone use provides high success rates in second trimester abortions (Newmann et al., 2010). A lacking of randomized double blind multicentric studies about therapeutic terminations of second trimester pregnancies has led to the administration of different regimes and doses of misoprostol. In literature,
Table 4. Expulsion numbers of the cases at 24 and 48 h, success rates and mean expulsion times.

<table>
<thead>
<tr>
<th>Dose</th>
<th>Expulsion Number (n)</th>
<th>Success rate (%)</th>
<th>Mean expulsion time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Following the first dose (administered within the first 24 h)</td>
<td>86</td>
<td>83.4</td>
<td>15.42±7.14</td>
</tr>
<tr>
<td>Repeated second dose regimen (administered within the second 24 h)</td>
<td>6</td>
<td>5.8</td>
<td>9.31±3.26</td>
</tr>
<tr>
<td>Total (after 48 h)</td>
<td>92</td>
<td>89.3</td>
<td>18.30±8.74</td>
</tr>
</tbody>
</table>

Table 5. Reasons for therapeutic termination and distribution in cases.

<table>
<thead>
<tr>
<th>Reason</th>
<th>Value (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fetal anomaly</td>
<td>15 (14.5)</td>
</tr>
<tr>
<td>Teratogen drug use</td>
<td>3 (2.9)</td>
</tr>
<tr>
<td>Anhydramniosis</td>
<td>24 (23.3)</td>
</tr>
<tr>
<td>Intrauterine fetal death</td>
<td>57 (55.3)</td>
</tr>
<tr>
<td>Radiation exposure + Teratogen drug use</td>
<td>4 (3.8)</td>
</tr>
</tbody>
</table>

Table 6. Complication rates.

<table>
<thead>
<tr>
<th>Complication</th>
<th>Rates in percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain requiring analgesic</td>
<td>18.4 (n:19)</td>
</tr>
<tr>
<td>Nausea</td>
<td>11.6 (n:12)</td>
</tr>
<tr>
<td>Fever &gt; 38°C</td>
<td>7.7 (n:8)</td>
</tr>
<tr>
<td>Headache and dizziness</td>
<td>5.8 (n:6)</td>
</tr>
<tr>
<td>Transfusion requiring haemorrhage</td>
<td>3.8 (n:4)</td>
</tr>
<tr>
<td>Vomiting</td>
<td>3.8 (n:4)</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>1.9 (n:2)</td>
</tr>
<tr>
<td>Uterine rupture</td>
<td>n:0</td>
</tr>
<tr>
<td>Mortality</td>
<td>n:0</td>
</tr>
</tbody>
</table>

Table 7. Mean expulsion time interval between the fetus and placenta, mean fetal and placental weight, mean bleeding volume, mean menstruation recovery time.

<table>
<thead>
<tr>
<th>Means of parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean expulsion time interval between the fetus and placenta</td>
<td>22±13 min</td>
</tr>
<tr>
<td>Mean fetal weight</td>
<td>564±310 g</td>
</tr>
<tr>
<td>Mean placental weight</td>
<td>147±98 g</td>
</tr>
<tr>
<td>Mean bleeding volume</td>
<td>340±126 cc</td>
</tr>
<tr>
<td>Mean menstruation recovery time</td>
<td>38±17 days</td>
</tr>
</tbody>
</table>

many misoprostol regimens have been described and recommended for the termination of second trimester pregnancies but as yet, the ideal dosage and regimen could not be described. The effectiveness and side effects of misoprostol were investigated by administering 600 μg misoprostol through the vaginal route in 6 and 12 h intervals. A significant difference was not detected in mean induction times and misoprostol dose was found to be higher in the 6 h interval group (1800 μg) compared to the 12 h interval group (1200 μg). 24 h cumulative abortion rates were found to be 74 and 67%, respectively for 6 and 12 h, and
48 h cumulative abortion rates were found to be 94 and 92%. When complication rates were analyzed, fever was found to be higher in the 6 h interval group (53 to 31%, p < 0.001). Nausea, vomiting, diarrhea, severe haemorrhage and abdominal pain rates were seen to be similar. It was concluded that misoprostol given at 12 h intervals through the vaginal route was as effective as the other group and reduced fever incidence (Yilmaz et al., 2005).

An 800 μg vaginal misoprostol every 6 h (max 3 doses/24 h) was seen to be quite effective in the termination of second trimester pregnancies. Soaking these tablets in acetic acid was seen to be more effective than soaking them in saline solution (Herabutya et al., 2005). Oral and vaginal routes were compared in the termination of second trimester pregnancies due to fetal anomaly. Patients were divided into three groups as the ones who receive 400 μg vaginal misoprostol every 6 h (Group 1), 400 μg oral misoprostol every 3 h (Group 2) and 200 μg oral misoprostol every 3 h following the 600 μg vaginal loading dose (Group 3). Group 1 was found to be 1.9 fold better compared to the others in terms of delivery rates over 24 h (Dickinson and Evans, 2003).

Multiparous women who would undergo medical abortion in the 16th or 20th gestational weeks were chosen and the administration of vaginal misoprostol (400 μg every 6 h) and combined oral-vaginal misoprostol (400 μg every 12 h followed by 400 μg at every 6 h) analyzed in terms of effectiveness. The mean expulsion time was found to be 13.28 h in the vaginal group and the expulsion rate was 83.33%; the mean expulsion time was found to be 8.93 h and the expulsion rate was found to be 87.5% in the combined oral-vaginal group (p < 0.05). According to these results, combined oral-vaginal misoprostol use was stated to have a higher success rate, shorter duration of hospital stay and low side effect incidence (Saha et al., 2006).

The misoprostol regimen used in our study was a 400 μg loading dose [200 μg vaginal (100 μg intracervical, 100 μg to the posterior fornix) and 200 μg oral misoprostol] followed by 200 μg of sequential doses in the 2nd and 4th h through the oral route. After it was soaked in saline solution, vaginal misoprostol was applied to the posterior fornix and intracervical region. The mean expulsion time was 15.4 ± 7.1 h for the first 24 h and the expulsion rate was found to be 83.4%. The mean expulsion time after the repeated dose in the second 24 h was 32.8 ± 6.3 h and this increased success rate by 5.8%. The mean expulsion time was 23.8 ± 14.3 h after 48 h and the overall success rate was found to be 89.3%. The mean expulsion times found in our study were similar to those of other studies (Kunwar et al., 2010).

Kazandi et al. (1999) administered misoprostol through the intravaginal and intracervical routes and an oral combined form. Combined use resulted in a 64% abortion rate over 12 h, 80% over 24 h and 100% over 48 h. The mean expulsion time was found to be 12.6 ± 10.4 h. Time to complete the procedure was found to be 9.2 in dead fetuses and 19.6 h in live fetuses (p < 0.05) (Kazandi et al., 1999). In our study, misoprostol was used through the intravaginal and intracervical routes and an oral combined form. The abortion achievement rate was 83.4% over the first 24 h and 89.3% over 48 h. The mean expulsion time was found to be 18.30 ± 8.74 h in our study and this time is longer than that of the compared study.

In another study, 400 μg intravaginal misoprostol was administered every 12 h. The success rate over 48 h was found to be 89.4% and the mean expulsion time was found to be 17.07 ± 9.96 h. Both the success rate over 48 h and the mean expulsion time were similar to those of ours. Complication rates in this study were as follows: fever 24.5%, abdominal pain 16%, nausea and vomiting 5.3% (Prachasilpchai et al., 2006). Complication rates in our study were as follows: fever 7.7%, nausea 11.6% and the combined oral and vaginal use was seen to reduce fever incidence however, it increased nausea incidence.

It is obvious that misoprostol use will lead to abdominal pain by causing uterine contractions. Pain is the leading complication described in many studies in the literature. However, what was different in our study was that analgesic requiring pain was taken as a complication, except for abdominal pain, which may be seen in almost every case. In the literature, apart from pain, the side effects of misoprostol are usually mild and self-limiting (Wildschut et al., 2011). Similarly in our study, except for pain, complication rates were low and other complications except nausea were self-limiting. Half of the cases were given antiemetic medications for nausea. Pongsatha and Tongsong (2011) found the most common complications to be chill (43.7%), analgesic-requiring pain (39.3%) and fever (34.3%) in their patients who received 400 μg misoprostol through the intravaginal route every 12 h. High doses (800 μg in 24 h) may have affected the higher complication rates.

Herabutya and O-Prasertsawat (1998) administered a 200, 400 and 600 μg misoprostol regimen every 12 h. Abortion success rates over 48 h were found to be 70.6, 82 and 96%. Nausea-vomiting was found to be 3.9, 12 and 20%, respectively. Diarrhea rates were 0, 6 and 22%; fever rates were 0, 2 and 28% and incomplete abortion rates were 35.3, 28 and 22%, respectively. In our study, the rate of nausea (11.6%) was found to be similar, fever rate (7.7%) was found to be higher however diarrhea rate (1.9%) was found to be lower based on the 24 h results. As seen in this study, the success rate increased as the dosage increased, however complication rates also increased. Severe complications like uterine rupture and mortality were also not seen in our study. Of the cases in our study group, 9.7% had a history of caesarean sections. Abortion was achieved with this protocol in 80%
of these cases. The remaining two cases underwent surgical interventions like hysterotomy and dilatation and evacuation. Uterine rupture complication did not develop in the subjects who had the history of caesarean section.

Daskalakis et al. (2005) compared two groups, one with a history of caesarean section and one without, in terms of the rates of the complications which developed as the result of termination of second trimester pregnancies. Complications like blood transfusion-requiring haemorrhage, post-abortion infection, placenta retention were present in 16 women out of the 108 in the study group and 26 out of the 216 women in the control group (15% versus 12%, p > 0.05). One rupture case was seen in the control group (Daskalakis et al., 2005). Similar to our study, misoprostol use was seen not to increase uterine rupture risk in cases who had undergone previous caesarean sections. However, studies are also available in the literature reporting the opposite (Pongsatha and Tongsong, 2006; Mazouni et al., 2006; Chapman et al., 1996). Uterine rupture was seen in the termination of second trimester pregnancies and also in cases which did not have uterine scars and which had been treated conservatively (Letourneur et al., 2002). Although complete and incomplete uterine ruptures have been reported in the literature, misoprostol use is appropriate and cost-effective in these cases (Gotoh et al., 2000; Nayki et al., 2005).

**Conclusion**

A combined oral and vaginal misoprostol regimen is relatively safe and quite effective with acceptable side effects in the termination of second trimester pregnancies when used carefully.

**REFERENCES**


Correlation between clinical and magnetic resonance imaging (MRI) findings in temporomandibular disorders

Osama Samara¹, Azmy M. Hadidy¹, Emad S. Tarawneh¹, Nosaiba T Al Ryalat¹, Dina Haroun ², Soukaina Ryalat³*

¹Departments of Radiology, Jordan University Hospital, Amman - Jordan.
²University of Jordan, P. O.Box 1669 Tela Al Ali 11953, Amman - Jordan.
³Oral and Maxillofacial Surgery, Oral Medicine, Oral Pathology and Periodontology, Faculty of Dentistry, University of Jordan, P. O. Box 1669 Tela Al Ali 11953, Amman - Jordan.

Accepted 24 October, 2012

This study was carried out to determine the value of Magnetic resonance imaging (MRI) as a diagnostic tool in patients with temporomandibular disorders. The clinical presentation and MRI findings on 88 temporomandibular joints belonging to 44 symptomatic patients were retrospectively studied. The disk position, configuration and signal intensity; mandibular condyle morphology and signal intensity; temporomandibular joint space and surrounding soft tissue abnormality were assessed. The correlation between the clinical and MRI findings was statistically analyzed using Fisher’s exact (1-sided) test. Pain in the temporomandibular region was the most common clinical presentation, it accounts for 64% of cases. There was significant correlation between pain, and disc displacement with no reduction (DDWN) and condylar hyperlaxity (p = 0.04, 0.03, respectively), as well as between clicking and each type of DD (p = 0.00). Statistically significant relationship was also found between tenderness, and DDWR and presence of joint effusion (p = 0.02, 0.03, respectively) as well as between limitation of mouth opening and condylar marrow edema (p = 0.02). Causes of temporomandibular disorders can be well defined by clinical examination. However, MRI can be preserved for patients with pain in whom an initial medical conservative oral treatment failed in order to exclude other pathological process.

Key words: Temporomandibular joint, magnetic resonance imaging, internal derangement, temporomandibular disorders.

INTRODUCTION

Temporomandibular joint (TMJ) is a synovial joint and the diseases that affect other joints such as disk displacement (DD), degenerative joint disease, inflammatory arthritis, infection and synovitis can affect TMJ. Temporomandibular disorders are the most common causes of facial pain after toothache (Parnes et al., 2006). It had been reported that its etiology is multi-factorial and still widely disputed in literature (Emshoff et al., 2003). However, several studies demonstrated that DD (Tallents et al., 2002; Katzberg et al., 1980) and muscular disorders affecting the masticatory system are the most common the most common causes of these disorders (Emshoff et al., 2003; Carlsson, 1999). The initial examination used to image TMJ is usually plain radiograph and conventional tomography, since arthritic changes and congenital bone abnormalities are visualized well on these imaging modalities. Computerized tomography (CT) scan has the advantage in allowing a perfect visualization of the osseous components of the TMJ (Baily et al., 1990).

Several authors considered that MRI is the imaging modality of choice in temporomandibular disorders as it provides detailed information regarding the disc, joint space, and adjacent soft tissue structures (Emshoff et al., 2003; Rao, 1995). Therefore, the aims and reasons of this retrospective study determined the correlation between clinical presentation and MRI findings, to identify the
the most common causes of patients’ symptoms, and clarify the utility of MRI as a diagnostic modality.

METHODS

Patients

All the MRI changes of the patients who underwent MRI examination in Jordan University Hospital between January 2004 and December 2008 were obtained. Complete medical records were found for 44 patients. Therefore, 88 TMJs in symptomatic patients were studied retrospectively. The clinical data were obtained from patients records. There were 31 female patients aged from 17 to 67 years, with a mean age of 29 ± 11 years, and 13 male patients aged from 18 to 43 years with a mean age of 26 ± 7 years. The patients presented clinically with either one or more of the following symptoms: pain, tenderness, clicking, and limitation of mouth opening. Complete stomatognathic examinations according to the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) were performed for all patients by three consultant Oral and maxillofacial surgeons.

Selection criteria

The criteria for including a patient in the study were the presence of pain in the temporomandibular region and presence of TMJ pain during palpation as well as with jaw function. Patients with ear problems and typical or atypical neuralgic facial pain were excluded. The patients were referred to our MRI unit for the evaluation of presence of DD or adjacent soft tissue anomalies that could be the source of patients’ symptoms.

Imaging technique and interpretation

All MR imaging were obtained with a 1.5 T Magnetom vision plus machine (Model of machine: Siemens, Germany) using bilateral TMJ surface coil. Our protocol consisted of oblique sagittal plane proton density and T2 weighted images at closed and then at open mouth. The images were taken for each side in each mouth position (closed and open) at angles perpendicular to the long axis of the mandibular condyle as determined by axial scout view image. A total of nine slices for each side in open and close position were obtained. The parameters used for proton density images were: slice thickness of 3 mm; repetition time, 2500 ms; echo time, 20 ms; field of view, 160 mm; and acquisition matrix size, 202 × 256. For T2-weighted images, the repetition time was 2900 ms, and the echo time was 80 ms.

Both TMJs were examined for disk position, disk configuration, signal intensity; morphology and signal intensity of mandibular condyle, presence or absence of joint effusion in the temporomandibular joint space, and signal intensity of surrounding soft tissues. Disk mobility was not assessed as CINE MRI is not available in our machine. The disk was considered normal if its posterior band was at 12 o’clock position relative to the mandibular condyle on close mouth position according to the criteria proposed by Katzberg and Westesson (1993); dumbbell-like configuration and hypointense homogenous signal. It was considered an abnormal position if the posterior band of the disk was in an anterior position relative to the superior part of the condyle. It was considered displaced anteriorly with reduction (DDWR) when the disk returns back to normal position on opened mouth. However, disk displacement without reduction (DDWNWR) was considered when the displaced disk had the same position in close or open position.

Disc configuration was considered abnormal if it was of uniform thickness (biplanar), having a thicker central part (biconvex), or showing an enlargement of its posterior band. Mandibular condyle was considered normal if it was rounded shape; it was considered edematous if its signal was bright on T2 weighted sequence. All MRI examinations were reported by two general radiologists who were unaware of clinical information and working together in consensus with MRI experience of 15 to 18 years.

Statistical analysis

Fisher’s exact (1-sided) test was used to define the relationship between each clinical presentation and MRI findings. It was also used to define the presence of an association among patients’ symptoms as well as among MRI findings. P value < 0.05 was considered statistically significant using SPSS 16 software package for statistical analysis.

RESULTS

Thirty-one out of 44 patients were female with a female to male ratio 2.4:1. Table 1 shows the clinical characteristics of 88 TMJs in 44 patients. Abnormal MRI findings were detected in 70% (62/88 TMJs) of symptomatic joints; of these 45% were seen in female patients. Anterior disk displacement was the most common MRI finding; it was detected in 34% (30/88 TMJs). The MRI findings in 88 joints are demonstrated in Table 2. Pain was the most common symptom (56 TMJs); it was associated with DD in 41% (23/56 TMJs), DD in 29% (16/56 TMJs) were with reduction and 13% (7/56 TMJs) without reduction. Pain with normal disk position was present in 59% (33/56 TMJ). Whereas, in about 22% (7/32 TMJs) where the disk was displaced, the side was painless. Clicking was the second common symptom (38 TMJs); it was associated with DD in 61% (23/38 TMJs); 39% (15/38 TMJs) were with reduction and 21% (8/38 TMJs) without

<table>
<thead>
<tr>
<th>Clinical presentation</th>
<th>Right TMJ</th>
<th>Left TMJ</th>
<th>Bilateral</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>10 (11)</td>
<td>10 (11)</td>
<td>36 (40)</td>
<td>56 (64)</td>
</tr>
<tr>
<td>Tenderness</td>
<td>11 (12.5)</td>
<td>17 (19)</td>
<td>- (-)</td>
<td>28 (32)</td>
</tr>
<tr>
<td>Clicking</td>
<td>12 (14)</td>
<td>8 (9)</td>
<td>18 (20)</td>
<td>38 (43)</td>
</tr>
<tr>
<td>Limitation of mouth opening</td>
<td>- (-)</td>
<td>- (-)</td>
<td>- (-)</td>
<td>34/44 patients</td>
</tr>
</tbody>
</table>
reduction and clicking with mouth opening noticed with normal disc position in 18% (7/38 TMJ). Whereas, at the side without clicking, DD was present in 30% (15/50 TMJs) of cases.

Limitation of mouth opening was observed in 34 patients with 68 TMJ, it was associated with DD in 38% (26/68 TMJs), 20% (14/68 TMJs) were without reduction, and 18% (12/68 TMJs) without reduction. Mouth opening limitation with normal disk position was observed in 62% (42/68 TMJs); whereas DD with normal mouth opening was observed in 85% (17/20 TMJs).

Tenderness at temporomandibular region was found in 28 TMJs; it was associated with DD in 43% (12/28 TMJs), 25% (7/28 TMJs) were with reduction and 18% (5/28 TMJs) without reduction. At the side of tenderness, normal disk position was found in 57% (16/28 TMJs) of cases. At the side without tenderness, DD was present in 30% (18/60 TMJs) of cases.

### Statistical results

On testing the relationship between the clinical presentation and MRI findings, a statistically significant relationship was found between pain and DDWR and condylar hyperlaxity (p = 0.04, 0.03, respectively), as well as between clicking and each type of DD (p = 0.00). Statistically significant relationship was also found between tenderness and DDWR and presence of joint effusion (p = 0.02, 0.03, respectively) as well as between mouth opening limitation and condylar marrow edema (p = 0.02). Detailed statistical relationship and percentage rates of association of each sign and symptom, and MRI findings are shown in Table 3. There was no statistically significant association neither among patients’ symptoms (p = 0.3 to 0.6), nor among MRI findings (p = 0.09 to 1). A significant relationship between tenderness and disk morphology was found (p = 0.02).

### DISCUSSION

Dysfunction of the TMJ is a common clinical problem, and imaging of the temporomandibular region has become essential in identifying the origin of patients’ symptoms. Seventy percent of our symptomatic patients demonstrated abnormalities in the temporomandibular region on MRI examinations. It had been reported that temporomandibular disorders are more common in female patients; the results of these studies were based on history and clinical examination (Gesch et al., 2004; Nassif and Hilsen, 1992). Although 70% of symptomatic patients in this study were females, abnormal MRI findings were seen in 45% females, and only in 25% male patients, respectively. Several authors described a relationship between psychological status of the patient such as depression and stress and temporomandibular disorders that may explain the difference in the frequency of symptoms and MRI abnormalities (Selaimen et al., 2007; Korszun et al., 1998).

It has been reported that DD can be seen in up to one-third of asymptomatic individuals (Kircos et al., 1987). Haley et al. (2001) demonstrated that 26% of DD were at the side without pain while this rate in our study was 43%. The results of the present study demonstrated that DD was the most common finding in symptomatic patient and that it compares favourably with the results of other studies (Emshoff et al., 2003; Tasaki et al., 1996). Farina et al. (2008) found a significant correlation between TMJ pain and MRI findings of DD, and that was only observed in our patients with DDWR (0.04). The incidence of DD in painful subjects in their study was 82%, and in ours was 54%.

Whyte et al. (2006) reported that DD is usually unilateral and reducible in asymptomatic patients while in symptomatic patients, it is bilateral and reducible in 76% of cases. Our results demonstrated that 83% of bilateral DD were reducible. In general, the reducible displaced disks were more common than the non-reducible disks
and that was in agreement with other reports (Tallents et al., 2002). In addition, our results as that of others did not find a statistically significant difference in the frequency of disk involvement of each side (Whyte et al., 2006).

MRI did not reveal any abnormality in 30% of our cases, and absence of DD in 66%; this indicates that DD is not the main source of patients’ symptoms. This finding is in accordance with that of Kobs et al. (2004). Emshoff et al. (2002) reported that MRI was considered as an imperfect standard of reference in TMJ disorders, as some of the DD depicted with high-resolution sonography were missed on MR images. Some authors questioned whether anterior DD is a pathologic finding or just a normal variant (Lieberman et al., 1992). However, in our study, no control subjects had been examined, so we cannot consider the variation normal unless documented as asymptomatic.

Joint effusion is a collection of fluid due to inflammatory changes in the synovial membrane. We did not find a statistically significant relationship between patient’s pain and the presence of joint effusion or bone marrow edema, and that was comparable to other reports (Farina et al., 2008; Adame et al., 1998).

Larheim et al. (2001) reported bone marrow abnormality in 31.4%. In our study, condylar bone marrow edema was found in only 5% of patients with no evidence of osteonecrosis, and that compares favourably with other report (Larheim et al., 2001b). Huh et al. (2003) reported that fluid collection was found more frequently with sub acute disk displacement without reduction, and the high signal intensity within the disk space should be considered a simple matter of fluid collection.

The etiology of this MRI finding in the literature is still under debate. Some authors found that joint effusion and DD are often present even in non-painful TMJ patients (Emshoff et al., 2003; Haley et al., 2001).

Although retrodiscal soft tissue edema was not a common finding in our patients, it was only observed during mouth opening and was no statistically related to patients’ symptoms. This can be explained by over-stretching of ligaments on mouth opening as mentioned by Sano and Westesson (1995) who attributed that to a functional hyperaemia and peri-vascular inflammation in painful TMJ.

Emshoff et al. (2003) found that osteoarthritic changes were present in 92% of asymptomatic control group subjects. It has been reported also that if osteoarthritic changes occur in young individuals, a longstanding disc displacement without reduction should be ruled out (Helms, 1998). This study did not demonstrate a statistically significant correlation between osteoarthritic changes and DD, neither with nor without reduction. However, local tenderness was associated with alteration in disk morphology (p = 0.02) which is usually related to degenerative changes and that could be attributed to the disrupted normal relationship with the adjacent structures.

Although limitation of mouth opening could be related to either arthrogenous or extra-articular problems, the causes of mouth opening limitation in our patients were unclear. The only statistically significant relationship was found with condylar marrow edema and that was only present in four patients. No significant association was found among patients’ symptoms in one hand, and among MRI findings on the other hand. This observation is important as it may indicate that the patients’ symptoms and MRI findings are non-specific to a certain pathological process.

**Conclusion**

Our data are in favour that temporomandibular disorders are most likely related to muscular and ligamentous

<table>
<thead>
<tr>
<th>MRI</th>
<th>Pain</th>
<th>Clicking</th>
<th>Mouth opening limitation</th>
<th>Tenderness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal disc position</td>
<td>33 (38)</td>
<td>15 (17)</td>
<td>21 (24)</td>
<td>16 (57)</td>
</tr>
<tr>
<td>DDWR</td>
<td>16 (18)</td>
<td>0.7</td>
<td>15 (17)</td>
<td>0.00</td>
</tr>
<tr>
<td>DDWNR</td>
<td>7 (8)</td>
<td>0.04</td>
<td>8 (9)</td>
<td>0.00</td>
</tr>
<tr>
<td>Disc morphology</td>
<td>10 (11)</td>
<td>0.1</td>
<td>7 (8)</td>
<td>0.2</td>
</tr>
<tr>
<td>Joint effusion</td>
<td>9 (10)</td>
<td>0.06</td>
<td>7 (8)</td>
<td>0.07</td>
</tr>
<tr>
<td>Osteoarthritis</td>
<td>1 (1)</td>
<td>0.1</td>
<td>2 (2.3)</td>
<td>0.6</td>
</tr>
<tr>
<td>Retrodiscal edema</td>
<td>6 (7)</td>
<td>0.4</td>
<td>3 (3.4)</td>
<td>0.5</td>
</tr>
<tr>
<td>Condylar hyperlaxity</td>
<td>13 (15)</td>
<td>0.03</td>
<td>6 (7)</td>
<td>0.5</td>
</tr>
<tr>
<td>Condylar marrow edema</td>
<td>3 (3.4)</td>
<td>0.5</td>
<td>1 (1)</td>
<td>0.4</td>
</tr>
</tbody>
</table>

P = P-value by Fisher’s exact (1-sided) test.
dysfunction rather than derangements in the TMJ itself. Therefore, the indications of MRI should be adapted according to patient symptoms where it may assist in determining the nature of the problem. Local tenderness is commonly related to degenerative condylar changes and the diagnosis can be confirmed by conventional tomography, clicking upon mouth opening is commonly associated with DD and does not require further MRI examination, and MRI is not sufficiently useful as a diagnostic modality to determine the cause of mouth opening limitation.

REFERENCES

UPCOMING CONFERENCES

Hawaii Heart 2013: Echocardiography & Multimodality Imaging, Case Based Clinical Decision Making, Kauai, USA, 4 Feb 2013

14th Annual Clinical Trial Supply Europe, Berlin, Germany, 26 Feb 2013

9th International Conference on Clinical Ethics Consultation, Munich, Germany, 14 Mar 2013
Conferences and Advert

**March 2013**
11th International Conference of Chemistry & its Role in Development, ElSheikh, Egypt, 11 Mar 2013

**April 2013**
23rd European Congress of Clinical Microbiology and Infectious Diseases, Berlin, Germany, 27 Apr 2013

3rd International Conference on Clinical and Experimental Cardiology, Chicago, USA, 15 Apr 2013
Journal of Clinical Medicine and Research

Related Journals Published by Academic Journals

- Journal of Metabolomics and Systems Biology
- Journal of Neuroscience and Behavioral Health
- Journal of Physiology and Pathophysiology
- Journal of Public Health and Epidemiology
- Medical Case Studies
- Medical Practice and Reviews
- Journal of General and Molecular Virology
- Research in Pharmaceutical Biotechnology