The prescription of drugs in a dental clinic of a Mexican university hospital

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Resumen

Objetivo: Evaluar la prescripción de medicamentos en una clínica odontológica de una universidad mexicana.

Método: Mediante un estudio observacional y descriptivo, se analizaron 698 prescripciones odontológicas en 14 servicios clínicos que conforman la clínica en estudio, enfocados a la conservación y restauración de la salud bucal en enero-junio 2005. Se registraron criterios como: medicamento prescrito, indicación, dosis, intervalo de dosificación, individualización de la terapia, duración de tratamiento y presencia de interacciones farmacológicas potenciales. Para determinar la inadecuación en los criterios de prescripción se comparó la información obtenida en recetas y expedientes clínicos, con la de la literatura especializada.

Resultados: Los medicamentos más prescritos fueron paracetamol, naproxeno, ampicilina y dicloxacilina (43.26, 15.38, 7.45 y 7.02%). La indicación, dosis e intervalo de dosificación fueron los criterios con mayor inadecuación en la prescripción. Las principales interacciones potenciales fueron entre los antiinflamatorios no esteroides y el captopril y la amoxicilina.

Conclusiones: Con lo anterior, se determinó que el 37.25% de las prescripciones fueron inadecuadas. A través de este estudio se establecieron estrategias que permitirán en un futuro tener una política de uso racional de los medicamentos empleados.


Summary

Objective: To assess the drug prescription service in a dental clinic of a Mexican university hospital.

Method: An observational, descriptive study was carried out which analysed 698 drugs prescribed for dental problems in 14 dental health care departments in our clinic between the period of January-June 2005. The following criteria were established: prescribed drug, indication, dosage, dosage interval, individualised treatment, treatment duration and potential drug interactions. Information taken from prescriptions and clinical records was compared with information from literature on the subject in order to determine the adequacy of prescription criteria.

Results: The most frequently prescribed drugs were paracetamol, naproxen, ampicillin and dicloxacillin (43.26, 15.38, 7.45 and 7.02%). The prescription criteria which showed the least adequacy were as follows: indication, dosage and dosage interval. The main potential drug interactions occurred between non-steroidal anti-inflammatory drugs and captopril/amoxicillin.

Conclusions: Taking the above into consideration, it was determined that 37.25% of prescriptions were inadequate. This study has helped to establish strategies which will facilitate the appropriate use of drugs in the future.

Key words: Prescription assessment. Dental clinics. Drugs.

INTRODUCTION

The objective of drug use studies is to help establish strategies to streamline treatment. These include drug prescription studies which analyse the link between indication and the patient’s pathology1-3.
In Mexico, hospital and clinical pharmacy activities are not routinely carried out, and universities have only recently begun to incorporate training focused on the appropriate use of drugs. Pharmacoepidemiology is quite recent and few studies in Mexico have been published on the subject of drug use and the reporting of adverse drug events.9-10.

The current state of the Mexican health system (drug shortages, breaches of legislation, inadequate health service to cater for all citizens) has led to a lack of good practices, established protocols and clinical practice guidelines for the appropriate use of drugs, and this in turn has led to problems with drug safety and treatment.11-13.

The care programmes provided by the dental clinic of the Health Sciences Institute (Universidad Autónoma del Estado de Hidalgo) are focused on carrying out preventative and rehabilitation treatments in an integral or individual way, through 14 specialised departments. Between 800 and 1,100 patients attend the clinic every six months and usually present symptoms of pain and inflammation.

Thus there is a need to assess the use of these supplies, taking into account the choice of adequate drug, availability, affordability, dispensing of drugs in appropriate conditions and correct dosage, according to the intervals and times indicated.8,14. This study aims to assess the drug prescription service in the dental clinic of a Mexican University Hospital, in order to propose strategies to improve the quality of this practice.

METHOD

An observational, descriptive study was carried out in the dental health care departments in our hospital. The study population included patients who received at least one drug prescription; this information was collected from prescriptions and clinical records during the period of January-June 2005.

A form was prepared to manually record data, including: department type, clinical record number, date, patient diagnosis, indication, prescription, dosage, individualised treatment, dosage interval, treatment duration and potential drug interactions.

The criteria used to assess the adequacy of the prescription were as follows:

— The indication: To verify correspondence between the diagnosis and prescription.

— The dosage: Expressed as the quantity of drugs given to the patient.

— Individualised treatment: The dosage was adjusted depending on the patient’s condition (renal and hepatic function and degree of malnutrition).

— The dosage interval: Assessing the frequency of administration of the dosage in accordance with dental problems.

— The treatment duration: In accordance with oral health problems (location and seriousness).

— Drug interactions: Taking into account inappropriate drug combinations.

Information collected from prescriptions and clinical records was compared with information from studies on this subject in order to establish the adequacy of the prescription. Two types of prescriptions were defined: a) adequate: if all of the criteria for use were fulfilled; and b) inadequate: if at least one of the criteria was not fulfilled. Economic aspects were considered when choosing the prescription and therefore on many occasions, the drug chosen to treat a pathology changed after assessing the risk-benefit and its cost. Treatment was assessed to determine if it was efficient, safe and affordable. Each criterion for the appropriate prescription of drugs had a binary categorical variable (adequate and inadequate).

RESULTS

698 prescriptions were analysed (22 drugs included). The most commonly prescribed drugs were analgesics, paracetamol (43.3%) and naproxen (15.3%), and antibiotics, ampicillin (7.45%) and dicloxacillin (7.02%).

A higher percentage of inadequacy was found for the following prescription assessment criteria: indication > treatment duration > dosage > dosage interval > individualised treatment (Table I). 37.25% of the prescriptions analysed corresponded to an inadequate prescription.

In Table II, it can be seen that 23 cases of potential interactions were found in the prescriptions analysed. In particular, we should mention 8 cases of captopril/non-steroidal analgesics (NSAIDs), which can result in the persistence of hypertension.

Table I. Inadequacy of criteria for appropriate use

<table>
<thead>
<tr>
<th>Criteria for appropriate use</th>
<th>Percentage of inadequacy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indication</td>
<td>24.07</td>
</tr>
<tr>
<td>Dosage</td>
<td>15.19</td>
</tr>
<tr>
<td>Dosage interval</td>
<td>11.61</td>
</tr>
<tr>
<td>Treatment duration</td>
<td>11.47</td>
</tr>
<tr>
<td>Individualised treatment</td>
<td>0.58</td>
</tr>
</tbody>
</table>

Table II. Potential drug interactions detected

<table>
<thead>
<tr>
<th>Drugs which interact</th>
<th>No. of cases</th>
<th>Appearance</th>
<th>Severity</th>
<th>Documentation</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Captopril/NSAIDs</td>
<td>8</td>
<td>Slow</td>
<td>High</td>
<td>Established</td>
<td>Decrease in efficacy of captopril</td>
</tr>
<tr>
<td>Amoxicilina/NSAIDs</td>
<td>7</td>
<td>Slow</td>
<td>High</td>
<td>Probable</td>
<td>Increase in risk of haemorrhage</td>
</tr>
<tr>
<td>Paracetamol/NSAIDs</td>
<td>5</td>
<td>Slow</td>
<td>High</td>
<td>Probable</td>
<td>Increase in risk of nephropathy, papillary necrosis and kidney cancer</td>
</tr>
<tr>
<td>Piroxicam/Glibenclamide</td>
<td>3</td>
<td>Slow</td>
<td>High</td>
<td>Probable</td>
<td>Increased hyperglycaemic effects of glibenclamide</td>
</tr>
</tbody>
</table>
DISCUSSION

Paracetamol and naproxen were the most frequently prescribed drugs, corresponding to the diagnoses presented: pulpitis, periapical abscess, periodontitis and pericoronitis. Furthermore, a study carried out in Mexico shows that the most frequently consumed drugs in dental clinics were NSAIDs (naproxen, metamizole and acetylsalicylic acid)\(^\text{21}\). These findings in addition to those from our study show that these are a group of drugs which are frequently prescribed in dental practice; their prescription involves the risk of presenting gastrointestinal adverse reactions (gastric erosion, peptic formation and perforation, bleeding and inflammation and changes in intestinal permeability), and haematological adverse reactions (aplastic anaemia or thrombocytopenia)\(^\text{15-20}\).

The data concerning the antibiotics prescribed in this study correspond to those recorded in a study carried out by an Odontological Specialities Unit in Mexico City. This study showed that the β-lactamic group is the one which is the most frequently prescribed\(^\text{22}\). The use of lincosamides, macrolides and tetracyclins is also worth mention. It is important that guidelines be established when prescribing antibiotics in order to avoid problems of strain resistance and treatment inefficiency\(^\text{15-19}\). In this study, the prescription of this group of drugs was empirical and no culture was used to determine the action spectrum of the drugs used. Furthermore, infections were not eliminated.

In Mexico, no studies which assess drug prescription in dentistry have been published; therefore, this study provides methodological information in order to carry out a diagnosis of the use of drugs and the prescription problems.

A study carried out in the Institute of Social Services of the Universidad Nacional del Noreste in Argentina in 1999 assessed the appropriate prescription of dental treatments. The results showed that the main cause of inappropriate prescription was due to the dispensing of drugs which are freely sold without an adequate formulary, leading to an increase in social security costs\(^\text{23}\). The case was similar in this study, where prescriptions were not chosen in accordance to dental diagnosis, and the first choice of drug was not used, opting for drugs which led to problems with safety, efficiency and affordability. There are various possible reasons: there is a lack of information about the prescribing doctors; dentist training courses in the country (pharmacology-drug treatment) are inadequate; prescriptions are made without analysing the specific cases of the patients.

With regard to the dosage, it was found that in most cases, the quantity of recommended drug for the pathology was increased, which led to toxicity problems in the patient. Furthermore, the treatment duration was not adequate; there were a fewer number of treatment days with antibiotics than those specified in the literature, promoting strain resistance and the presence of recurring infections.

Drugs were indicated which did not constitute first line treatment, without justifying their use (for example hypersensitivity problems or affordability). There were safety problems with the drugs used (adverse reactions). These data cannot be compared with similar scientific findings, since the studies carried out in Mexico do not deal with the same issue nor do they describe the use of the drug.

The analysis of the interactions shows that there was a low, yet clinically significant percentage (3.29%) of patients receiving polytherapy. This mainly included NSAIDs with captopril, amoxicillin, paracetamol and glibencilamide (Table III), leading to a decrease in efficacy, exacerbation of the effect or an increase in the toxicity of some of the drugs. These results correspond to those presented in a conference organised by the International Association for Dental Research carried out in the USA, in which the most frequently prescribed drugs were analysed along with their interactions, showing notable results for analgesics and antibiotics\(^\text{24,25}\).

Using the results obtained, we proposed the establishment of a programme to the hospital director focused on providing information about drugs to the prescribing doctors in order to improve treatment. We also proposed the implementation of a permanent monitoring and assessment programme for the use of drugs, promoting the active diffusion of the results to dentists. Furthermore, the best options should be assessed so that prescriptions are more economical, safer and more efficient.

Established protocols are required for the treatment of dental problems, which take into consideration criteria for appropriate use and economic aspects.

<table>
<thead>
<tr>
<th>Criteria for rational use of drugs</th>
<th>Statistical significance</th>
<th>Relative risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indication</td>
<td>0.029*</td>
<td>1.84</td>
</tr>
<tr>
<td>Adequate</td>
<td>0.035*</td>
<td>15.56</td>
</tr>
<tr>
<td>Inadequate</td>
<td>0.021*</td>
<td></td>
</tr>
<tr>
<td>Dose</td>
<td>0.002*</td>
<td></td>
</tr>
<tr>
<td>Adequate</td>
<td>0.541</td>
<td>0.32</td>
</tr>
<tr>
<td>Inadequate</td>
<td>0.010*</td>
<td>29.49</td>
</tr>
<tr>
<td>Dosing interval</td>
<td>0.012*</td>
<td></td>
</tr>
<tr>
<td>Adequate</td>
<td>0.026*</td>
<td>1.17</td>
</tr>
<tr>
<td>Inadequate</td>
<td>0.017*</td>
<td>13.18</td>
</tr>
<tr>
<td>Treatment duration</td>
<td>0.032*</td>
<td></td>
</tr>
<tr>
<td>Adequate</td>
<td>0.040*</td>
<td>1.75</td>
</tr>
<tr>
<td>Inadequate</td>
<td>0.016*</td>
<td>20.13</td>
</tr>
</tbody>
</table>

Logistic regression; *statistical significance p < 0.05.
References


