2 Editorial

Ahmad Husari

Original Contribution / Clinical Investigation

3 Evaluation of physical examination findings in acute abdominal patients who apply to emergency service

Ergun Kaya, Guven Kuvandik, Ali Karakus, Edip Ucar, M. Murat Celik, Akin Aydogan

9 The incidence and risk factors of incisional hernia in post-caesarean sections

Mohammad Ali Ajlouni

13 Levels of Total Fucose and Total Protein in Sera of Blood Groups and RBCs of Control, Minor and Major Thalassemic Patients

Tarik Al-Hakeem, Hamid Gaffoori Hasan, Zeyan Abdullah Ali

Review Article

18 Tracheostomy and Weaning

Qasim Khamaiseh

Community Care

22 Causes of blindness in the Jordanian population

Suheer Hamarneh

Models and Methods and Clinical Research

28 Pomegranate seed oil ameliorates paracetamol induced hepato-and nephro-toxicity in rats

Nidhal AK Mohammed Ali, Shatha Zakr Saeed

Office Based medicine

37 Foot drop, atypical presentation for ADEM. A case report in Kuwait and review of the literature

Gehan Hamdy, Red Helal, Loqman Hatem Hassino, Solomon T.D., Ibrahim Hamed, Aiad Askar
This is the second issue this year and deals with topics varying from abdominal pain to blindness.

A paper from Turkey evaluated the physical examination findings in acute abdominal patients who presented to emergency service. The authors stressed that determination of the differential diagnosis of a patient presenting with this kind of abdominal pain, the decision of having an operation or not and determination of discharging from hospital are the main issues that an emergency medicine specialist has difficulty with. A total of 76 patients were evaluated prospectively. The results of the first presentation physical examination findings were found meaningful as appropriate with the internal, surgical and surgical medical clinic classification that the patients received treatment and lastly diagnoses. The authors concluded that the last diagnosis of non-specific abdominal pain constitutes 34-53% of the patients with abdominal pain in the emergency services.

A study looked at the possibility of weaning after tracheostomy. A total of 105 adult patients were enrolled in this study; two groups of patients were taken from the first group: for weaning from mechanical ventilators while the patients are on endotracheal tube and the second group underwent weaning while the tracheostomy is done, in patients who need a long stay in ICU. All patients weaned from ventilators while being tracheostomized were more easy and faster than the group of nontracheostomized. The authors concluded that tracheostomy helps the ICU patients to be weaned from mechanical ventilation, faster than while the patients are on endotracheal tubes.

A retrospective study from Jordan aimed to identify the major causes of blindness in the Jordanian population among patients presenting to ophthalmology clinics. The most common causes of blindness among the study group were cataract (49.1%), glaucoma (15.9%), and diabetic retinopathy (13.3%). Other causes were AMD (1.9%). Glaucoma was the leading cause of blindness in the young age group, while cataract was the most common cause of blindness in middle and old age groups. The authors concluded that understanding the causes of blindness, especially the preventable and curative causes, is important in decreasing the prevalence of blindness.

A case report from Kuwait looked at atypical presentation for ADEM and review of the literature. Acute disseminated encephalomyelitis (ADEM) is an immune mediated neurological disorder characterized by inflammation of the brain and spinal cord caused by damage to the myelin sheath. ADEM may occur in association with a viral or bacterial infection, as a complication of inoculation or vaccination, or without a preceding cause. Onset of the disorder is sudden. The authors reported a 42 years Kuwaiti gentleman who presented with left foot drop and parathesia. ADEM complicating chickenpox infection was found to be the underlying cause. They based the diagnosis of ADEM in this case on the typical antecedent post infectious presentation, MRI findings of the brain and spinal cord.

A prospective study was conducted to assess the current incidence of incisional hernia post cesarean section amongst women attending surgical outpatient clinic, and also to evaluate the epidemiological factors in those women. A total of 94 women attending surgical outpatients’ clinic at Prince Rashid Bin-Al-Hassan Military Hospital, Irbid-Jordan were studied. The current incidence of incisional hernia post cesarean section was 3.8%. It followed midline incision in 84% of patients and pannenstiel incision in 16%. 28.5% of all incisional hernias developed in the first 6 months after the operation and 55.8% after 1 year. The authors concluded that the development of incisional hernia following cesarean section is uncommon but higher than previously reported. Many predisposing factors for incisional hernia may reduce the overall incidence of incisional ventral hernia when corrected.

A paper from Baghdad aimed to measure the concentration of fucose and TP in sera and erythrocytes for minor and major thalassemic patients according to blood groups and compared those to healthy individuals. Total fucose, total protein and TF/TP ratio were determined in sera and RBCs according to their blood type groups for 40 control, (40 T minor) and (45 T major). No significant differences were found in TP in sera and RBCs of T minor, T major and control considering each blood type group. A significant increase in TF level in sera of T major compared to TF for T minor and TF for control, also a significant increase in TF for T major compared to T minor. A significant increase in TF/TP in the sera of T major compared to the ratio in T minor and control was noticed. The ratio of TF/TP in T major was significantly higher than that for T minor and controls.

A paper from Hawler Medical College looked at the effect of Pomegranate seed oil in ameliorating paracetamol induced hepatic and nephrotoxicity in rats. Thirty rats were divided into three equal groups; a placebo group, paracetamol (PCT) group dosed orally 750 mg/kg paracetamol and PSO-group given 1000mg/kg pomegranate seed oil twice daily with 750 mg/kg PCT for fourteen days. PSO produced significant (P<0.05) hepatoprotection by decreasing hepatospecific markers (serum glutamate oxalate transaminase and serum glutamate pyruvate transaminase, alkaline phosphatase, total serum bilirubin and malondialdehyde) and significantly increased the levels of glutathione (GSH) in PSO-treated group. The levels of kidney function test parameters (urea, creatinine and uric acid) retrieved significantly to normal by treatment with PSO. Paracetamol plasma concentrations determined in the PSO-treated group were significantly lower than those in the PCT-group. The authors concluded that pomegranate seed oil ameliorates hepatic and nephrotoxicity of paracetamol over dosage.
Evaluation of physical examination findings in acute abdominal patients who apply to emergency service

ABSTRACT

Background: A patient with acute onset of abdominal pain is a frequently encountered patient group in emergency service. The pain that lasts less than a week is called acute pain. Determination of the differential diagnosis of a patient coming with this kind of abdominal pain, the decision of having an operation or not and determination of discharge from hospital are main issues that an emergency medicine specialist has difficulty with. Today, developed countries and recently developing countries seek to provide health services that are more active, cheaper and easily accessible.

Methods: In the research which is prospective, 150 patients with a last seven days history of abdominal pain, in which 76 patients were male (51.3 %) and 74 were female (48.7%), were evaluated in the department of Emergency Medicine of Mustafa Kemal University.

Results: The results of the first visit physical examination findings were found meaningful as appropriate with the internal, surgical and surgical medical clinic classification that the patients received treatment and last diagnoses. A meaningful result was also statistically found in the comparison of the physical examination findings of the patients who underwent a surgical operation and direct imaging. The physical examination findings were found meaningful in the patients with the diagnosis of non-specific abdominal pain who are mostly encountered in emergency services.

Conclusions: Consequently, as we show in our research and as understood from general literature studies, the last diagnosis non-specific abdominal pain constitutes 34-53 % of the patients with abdominal pain in the emergency services. In addition to diagnosing these patients with physical examination findings, methods of laboratory and imaging are also needed for differential diagnosis.

Key Words: Acute abdominal pain, physical examination, emergency service

Original Contribution and Clinical Investigation

Introduction

The patient group with abdominal pain constitutes an important portion of applications for emergency service. It is important to take a good history and know the reasons and mechanisms of internal and external abdominal pains in order to evaluate the abdominal pain appropriately and give good treatment to the patient [1]. The pain that lasts less than a week is called acute pain. If all patients with acute abdominal pain are handled, 40% of patients with abdominal pain which does not conform to known abdominal pain forms, have no clear and understandable results and the pain ceases by itself when they are kept mostly under examination [2].

Recently, especially in our country, using the services that are provided us by modern medicine randomly and without thinking, the results may greatly damage the economy of the country, the doctors educated and the rights of patients. In this research, it is aimed to determine the importance of anamnesis and physical examination (PE) again which remains at second, even third rank today and were used as tool of diagnosis by doctors once upon a time, and make the correlations with examinations and reveal what can be done to minimize medical expenses and time.

In much researche conducted on this issue, it will statistically be seen that the diagnoses and treatments of the patients with abdominal pain are completed with anamnesis, physical examination, observation and methods of routine laboratory and imaging which can be done in all conditions. Due to
workload of emergency services which is increasing today and will increase more in future, we believe that expanding this research will provide time, quality and decrease in workload of the emergency service staff, correct and short-term diagnosis and treatment for the patients, and economic savings for social security institutions.

**Material and Method**

This research was prospectively planned in the department of Emergency Medicine of Mustafa Kemal University and realized after obtaining approval of the ethical committee. 150 patients with abdominal pain, lasting for the last seven days who attended the emergency service and were more than 18 years old, not pregnant, and who did not have a history of trauma and malignancy or history of gastro-intestinal system disease were included. Consent by the patients, as appropriate to the criteria was taken with approval forms. The results of examinations such as history, physical examination findings, exact blood account, biochemistry (AST, ALT, LDH, lipase, amylase), direct abdominal imaging, abdominal ultrasonography which should be done routinely in the evaluation of disease, with research form, were assessed.

The acute abdominal pain developing secondary to trauma, being under 18 years old, pregnancy and refusing participation in the research were determined as excluding criteria.

Data of our research were recorded by using computer program called Statistical Package for the Social Sciences (SPSS). All analyses were done with 95 % confidence interval and the level of meaningfulness was taken as p<0.05.

**Results**

150 patients were included into the research. 76 of the patients were male (51.3 %) and 74 of them were female (48.7%). The lowest age of the patients was 19, the highest was 94 and the average was computed as 44.60 ±19.89.

There were abnormal physical examination findings in 146 patients that were included into the research. In these patients; while 42 (27.6%) sensibility, 6 (3.9%) diffuse sensibility, 9 (5.9%) defence, 10 (6.6%) rebound, 9 (5.9%) defence-rebound, 33 (21.7%) defence-rebound-sensibility were positive, there were findings of Murphy’s sign in 23 (15.1%) and costovertebralangle sensibility in 14 (9.2%). (Table 1 - opposite page).

It was seen that 15 (10%) of the 42 (28%) patients who had defence, rebound and sensibility in physical examination (PE) took surgical treatment. Only 1 (0.66%) of the 9 (6%) patients who were determined to have defence at the first physical examination had a surgical operation. Only 2 (1.33%) of the 10 (6.66%) patients who were determined to have rebound at the first physical examination had a surgical operation. In the physical examination (FE), while 30 (20%) of the 42 (28%) patients who were determined only local sensibility took internal treatment, 2 (1.33%) took surgical treatment, 6 (4%) patients having diffuse sensibility took only interior and surgical medical treatment, and surgical treatment was notgiven. (Table 1).

Sensibility 30 (71.4%) was determined in patients who mostly took treatment in interior services from the physical examination findings in 150 patients applying to emergency service with an abdominal pain complaint. The most frequent second physical examination was followed in surgical services and the physical examination finding, including defence-rebound-sensibility, was determined in 15 (45.5%) patients who were not given a surgical operation (surgical medical treatment). When making a comparison statistically between physical examination findings and clinical diagnoses of the patients, a meaningful and strong correlation was found. (p<0.001) (Table 1).

In the evaluation of physical examination findings determined as a consequence of patients’ applications for emergency services and the diagnoses taken; gall bladder diseases were determined in 17 (73.91%) of total 23 patients who were determined to have a finding of Murphy’s sign (p<0.001) (Table 2 - page 6). The other diagnoses taken by the patients whose Murphy findings were positive were determined in 3 (13%) patients belonging to GiS, 1 (4.3 %) belonging to urinary system and 4 (17.4%) who had normal USG.

Non-specific abdominal pain (NSKA) was determined in 32 (66.66%) of total 48 patients who had sensibility and diffuse sensibility. A meaningful correlation was statistically found between physical examination and clinical diagnosis in this patient group (p<0.001) (Table 2).

Diagnoses of Ileus-volvulus and acute appendicitis were determined in 24 (72.72%) of total 33 patients who had defence-rebound-sensibility. There was statistically not a meaningful result between physical diagnoses and clinical diagnosis in this patient group (p<0.296) (Table 2).

Diagnoses about renal and urinary system pathologies were taken in 14 (46.66%) patients who had costovertebral angle sensibility and in a total 30 patients who had renal diseases and urinary infection. There is statistically a meaningful correlation between physical examination and clinical diagnosis in this patient group even if it is low (P>0.053) (Table 2).

There cannot statistically be found any meaningful relation in the comparison of rectal palpation (RP) and clinical diagnoses (p>0.417). 52 (34.7%) of 150 patients included into the research could not be given RP (rectal palpation). The reasons of not doing RP were refusing of patient, doctor’s not approving and physical conditions. 98 (65.3%) patients participating in the research did not undergo RP. Of the 67 (44.7%) patients whose RP was normal, 34 (51.3%) had interior medical treatment, 11 (16.4%) had surgical treatment and 22 (32.8%) patients had surgical medical treatment. Of the 31 (20.7%) patients whose RP was abnormal, while 9 (29.0%) had surgical treatment and 13 (41.9%) had surgical medical treatment, 9 (29.0%) had interior treatment. Of the 52 (34.7%) patients whose RP was not done, 9 (17.3%) had surgical treatment, 23 (44.2%) had interior medical treatment and 20 (38.5%) had surgical medical treatment. A meaningfulness could not statistically be found between the patients taking non-specific abdominal
Table 1: Clinical classification of physical examination findings that are determined as a consequence of patients’ applications for emergency services

<table>
<thead>
<tr>
<th>Physical examination</th>
<th>PE</th>
<th>Result</th>
<th>Result</th>
<th>Result</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>internal</td>
<td>surgical</td>
<td>surgical/medical</td>
<td></td>
</tr>
<tr>
<td>Sensibility (S)</td>
<td>N</td>
<td>30</td>
<td>2</td>
<td>10</td>
<td>42</td>
</tr>
<tr>
<td>%PE</td>
<td></td>
<td>71.4%</td>
<td>4.8%</td>
<td>23.8%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Diffuse Sensibility (DS)</td>
<td>N</td>
<td>4</td>
<td>0</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>%PE</td>
<td></td>
<td>66.7%</td>
<td>0%</td>
<td>33.3%</td>
<td>100%</td>
</tr>
<tr>
<td>Defence (D)</td>
<td>N</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>%PE</td>
<td></td>
<td>44.4%</td>
<td>11.1%</td>
<td>44.4%</td>
<td>100%</td>
</tr>
<tr>
<td>Rebound (R)</td>
<td>N</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>%PE</td>
<td></td>
<td>60%</td>
<td>20%</td>
<td>20%</td>
<td>100%</td>
</tr>
<tr>
<td>DR</td>
<td>N</td>
<td>1</td>
<td>4</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>%PE</td>
<td></td>
<td>11.1%</td>
<td>44.4%</td>
<td>44.4%</td>
<td>100%</td>
</tr>
<tr>
<td>DRH</td>
<td>N</td>
<td>7</td>
<td>11</td>
<td>15</td>
<td>33</td>
</tr>
<tr>
<td>%PE</td>
<td></td>
<td>21.2%</td>
<td>33.3%</td>
<td>45.5%</td>
<td>100%</td>
</tr>
<tr>
<td>Murphy’s sign Finding</td>
<td>N</td>
<td>7</td>
<td>7</td>
<td>9</td>
<td>23</td>
</tr>
<tr>
<td>%PE</td>
<td></td>
<td>30.4%</td>
<td>30.4%</td>
<td>39.1%</td>
<td>100%</td>
</tr>
<tr>
<td>Normal physical examination</td>
<td>N</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>%PE</td>
<td></td>
<td>75%</td>
<td>0%</td>
<td>25%</td>
<td>100%</td>
</tr>
<tr>
<td>Total</td>
<td>N</td>
<td>66</td>
<td>29</td>
<td>55</td>
<td>150</td>
</tr>
<tr>
<td>%PE</td>
<td></td>
<td>44%</td>
<td>19.3%</td>
<td>36.7%</td>
<td>100%</td>
</tr>
<tr>
<td>P&lt;0.001</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Clinical classification of physical examination findings that are determined as a consequence of patients’ applications for emergency services

A meaningfulness could not statistically be determined between the values of patients’ studied white glob, hemoglobin, hemotokrit, SGOT, SGPT, LDH, Amylase, Lipase and clinical diagnoses.

Direct imaging and abdominal USG examination was given to all patients who participated in our research and direct graphy was evaluated as normal in 35 patients whose USG was at normal levels. Abdominal USG was positive at 80% in 12 (66.7%) patients whose direct graphy was abnormal. In patients who were given surgical treatment whose direct scan was normal, but USG result was positive, the result of USG belonging to the most hepatobiliary system was evaluated as (63.6%). Although abdominal USG was evaluated as positive in 29 (19.33%) for patients who were given surgical treatment, the result of direct graphy was evaluated as normal in 11 (7.34%) of these patients. Direct graphy was also evaluated as positive in 18 (12%) of these patients having surgical treatment. Defence, rebound and sensibility were determined as a physical examination finding in 18 (12%) of total 29 (19.4%) of patients who were given a surgical operation.

In the comparison of the physical examination findings of the patients’ who participated in our research and direct imaging , who applied to the emergency service with a complaint of abdominal pain and had diagnoses of interior diseases (p>0.912), there was not any statistically meaningful relation. In the comparison of the patients’ physical examination findings and direct graphy (p<0.009), a meaningfulness was statistically determined.
In the comparison of the patients’ physical examination findings and direct graphy, those who applied to the emergency service with a complaint of abdominal pain and were given surgical medical treatment (p>0.463), meaningfulness could not statistically be found.

In the clinical comparison of the patients’ direct graphy and USG results, a meaningful result was statistically found (p<0.007).

In the comparison of the result of abdominal USG and the last diagnosis about ileus volvulus diseases, the result was statistically found meaningful (p<0.006).

A meaningful relation could not statistically be found in the comparison of the result of abdominal USG and acute appendicitis (p>0.223).

Of the 150 patients who participated in our research, diagnosis of acute appendicitis was taken in 17 (11.3%). 2 (11.8%) of the patients had interior medical treatment, 10 (58.8%) had surgical treatment and 5 (29.4%) had surgical medical treatment.

In the comparison of the patients’ non-specific abdominal pain and abdominal USG, a meaningfulness was statistically found (p<0.001). Diagnosis of non-specific abdominal pain was taken in 44 (29.5%) patients of a total 150 patients who participated our research. 32 (21.33%) of these patients were discharged from hospital after they had been observed in emergency service. 1 (0.66%) of them were given laparoscopic treatment as their complaints did not cease in spite of adequate observation in emergency service. 1 (7.33%) patient had surgical medical treatment.

Discussion
There was a real complaint of acute abdominal pain in 5% who applied to emergency services. 6.5% of all Emergency Service (ES) applications in USA were abdominal pain [3]. When mentioning acute abdominal pain, abdominal pathologies which are not dependent on trauma and start abruptly and require surgical treatment are understood. There are also metabolic reasons, reasons depending on medicines or urinary system pathologies, among the reasons for acute abdominal pain which a doctor should consider in a differential diagnosis. In addition, possibilities such as diabetic ketoacidosis, hypoglycemia, porphyria, acute adrenal failure, salicylism, lead poisoning, and familial Mediterranean fever can make the diagnosis more difficult. The last definition of acute abdominal pain which does not have any reason is non-specific abdominal pain [4,5]. The proportion of non-specific abdominal pain was reported between 34-53 in several studies [6]. That is 44 (29.3%) of 150 patients who were taken into our research were discharged from hospital without diagnosis shows that our proportion of non-specific abdominal pain presentations is appropriate with the literature.

According to the 2004 data of Turkish Statistics Institution, 350,432 patients were hospitalized due to peptic ulcer, gastritis, duodenitis, acute appendicitis and intestinal obstruction which takes an important place among abdominal pains and present to the emergency service [7]. That is why serious economical data are reached if the example above is calculated.
determined in the patients with acute cholecystitis on physical examination, but it is not very reliable in the patients who are more than 65 [8,9].

Diagnosis of ileus-volvulus and acute appendicitis was taken in 24 (72.72%) of a total 33 patients who had defence-rebound-sensibility. There is statistically not any meaningful result between physical examination and clinical diagnosis (p>0.296). Symptom of psoas, rigidity and sensibility are not specific for acute appendicitis [10].

Diagnosis about renal and urinary system pathologies was taken from 14 (46.66%) patients who had costo-vertebral angle sensibility, from a total of 30 patients who had a diagnosis of renal diseases and urinary infection. There is statistically a meaningful correlation, even if it is low, between physical examination and clinical diagnosis in this patient group (p=0.053). Again as a result of the patients’ physical examination findings conducted, in a research evaluated by Çaliskan M. et al, it was reported that there was sensibility in abdomen in 948 (99.1%) of the 957 patients with abdominal pain, defence in 244 (25.5%) and rebound in 146 (153%)[11].

There are studies that state the place and importance of rectal palpation in physical examination in the annuals of the World Health Organization. Although emergency services are one of the clinical fields where rectal palpation can be applied, it is revealed that RP is not frequently used as a result of the observations made. Positive examination finding was obtained about acute or chronic bleeding in 10 % of the patients who applied for emergency services [12]. The result of rectal palpation applied to our patients in our research was recorded as normal (67 (44.7%), abnormal 31 (20.7%) and not done 52 (34.7%). The examinations that people abstain from, such as rectal palpation, can be provided by explaining the importance of the examination to the patients.

Abdominal graphy is the mostly used radiological method for abdominal pain. Even if it does not provide additional information for potential diagnosis, it is used in order to exclude other diseases in the differential diagnosis. That it shows the free air and reveals air-liquid levels are the most profitable specifications. Direct graphy of all 150 patients who were included in the research was taken. While there was not any pathology in 99 (66%) patients standing of 150, air-liquid level, intensive gas belonging to GIS, opacity suitable with gall bladder, and opacity in urinary track were determined. Direct graphy is a cheaper and more easily accessible examination than USG and CT. As free air under diaphragm shows performance of GIS, air liquid level videilate circulations of ileus-volvulusa can be seen. Renal stones can be shown in 90% and abnormal stones such as bladder stones can be shown in 10% [13]. When comparing the direct graphy in patients with acute abdominal pain and laparoscopic surgical result, its sensitivity is 64% and specificity is 68% [12]. Air liquid level was determined in 16 of 21 (14%) patients who were diagnosed with ileus-volvulus and treated. While 18 patients whose direct graphies were abnormal were given surgical treatment, again 18 patients whose direct graphices were abnormal had surgical medical treatment and were discharged from hospital. 11 patients whose direct graphies were normal were given surgical treatment in our research. While direct graphy was abnormal in 16 patients who hadileus volvulus diagnosis in patients’ USG results and after treatment diagnoses, direct graphy was found normal in 5 patients. Direct graphy was found abnormal in 8 patients who were diagnosed with acute appendicitis and given surgical treatment; in the 5 patients who had inferior and surgical medical treatment and direct graphy it was found as normal in 4 patients. In the research conducted by Caliskan M. et al, although there were 11 patients who had mechanical intestinal obstruction and 4 patients whohad peptic ulcer perforation developing, of the air-liquid levels (5.3%) in 50 of the patients, free air was determined only in one. While 652 (68.6%) of the 951 patients whose flat abdomen graphies were evaluated as normal, meteorism was determined in 248 (26.1%) [11].

USG of all of 150 patients included in the research were taken. Hepatobiliary system diseases were found as normal in 24 (16%) patients, diseases of GUS were found as normal in 52 (34.7%), urinary system diseases were found as normal in 27 (18%), female genital diseases were found as normal in 4 (2.7%) and in 43 (28.7%). In abdominal USG and specific clinical diagnosis, gall bladder and diseases of biliary tract were determined in 22 (14.7%), acute appendicitis in 17 (11.3%), renal stone in 20 (13.3%), hydrenephrosis, cyst, etc in 4 (2.7%) and adnexal diseases were determined. In a study conducted by Klothter HJ and etal, when ultrasonography was added in clinical examination, diagnosis of appendicitis passed 90% and portion of negative laparotomy was found low [14]. In a study conducted by Ohmann C. and et al, right diagnosis in acute abdomen is about 62-87% when it is not used and about 83-90% when it is used [15]. In a study conducted by Shea JA and et al, sensitivity was reported as 84% and its specificity was reported as 99% [16].
Conclusion
When all of these were evaluated and considered, as diagnosing acute abdominal pain in a short time in emergency services is among the elements that affects patients’ mortality and morbidity, keeping the records of adequate and detailed anamnesis, serial physical examination and patients, and recording the operations conducted have continued to be the best and the most active tool of diagnosing. Use of developed spiral CT and the fact that there are no laparoscopic methods in each hospital reveal the importance of anamnesis and physical examination.

References
The incidence and risk factors of incisional hernia in post-caesarean sections

Mohammad Ali Ajlouni

Correspondence:
Dr. Mohammad Ali Ajlouni
Department of Surgery
Royal Medical Services
Irbid, Jordan
Tel: 0775175688
Email: mkateeb@lycos.com

Introduction

An incisional hernia, also called a ventral hernia, is a bulge or protrusion that occurs near or directly along a prior abdominal surgical incision. It has been described as a bulge visible and palpable when the patient is standing and often requiring support and repair(1). Incisional hernia formation is one of the most frequent complications in visceral surgery requiring reoperation. Risk factors for incisional hernia formation and preventive strategies are not clearly defined(2).

Caesarean operations accounted for most of the postoperative incisional hernias seen in our surgical clinic. The accurate incidence of incisional hernia after cesarean section is unknown. Incidence of 3.1-5.6 % has been reported(3,4). Over half of incisional hernias are diagnosed within the first year after surgery, and approximately 80% are diagnosed within the first 3 years(5). Incisional hernias are more likely to occur when a patient’s wound has been poorly sutured, particularly with catgut, or has become infected, or if she has a chronic cough, anemia, diabetes mellitus, jaundice, obesity or some serious systemic disease, such as advanced malignancy(6).

Review of the literature on caesarean section in Jordan revealed inadequate recognition of this late consequence despite the increasing rate of caesarean section(7,8). So in this study we try to assess, the current incidence of incisional hernia post cesarean section amongst women attending surgical outpatient clinic in this hospital in the north of Jordan. Also we evaluate the risk factors associated with incisional hernia in those women.

Methods

This is a prospective study of 94 women attending the surgical outpatients’ clinic. This study was conducted between the 1st of July 2008 and the end of August 2010 at Prince Rashid Bin-Al-Hassan Military hospital in the north of Jordan. The inclusion criteria include women who presented with incisional hernia post caesarean section either Pfannenstiel or midline incision. The study was approved by the ethics committee and informed written consent from all participants was obtained.

ABSTRACT

Objectives: To assess the current incidence of incisional hernia post cesarean section amongst women attending surgical outpatient clinic, and also to evaluate the epidemiological factors in those women.

Methods: This is a prospective study of 94 women attending surgical outpatients’ clinic during a period of two years between July 2008 and August 2010 at Prince Rashid Bin-Al-Hassan Military Hospital, Irbid, Jordan. The influence of demographic data, pre-, intra- and post-operative risk factors for incisional hernia development were evaluated.

Results: The current incidence of incisional hernia post cesarean section was 3.8%. It followed midline incision in 84% patients and Pfannenstiel incision in 16%. 28.5% of all incisional hernias developed in the first 6 months after the operation and 55.8% after 1 year. 84% had midline incisions, wound infections occurred in 71.3%, previous one or more caesarean sections 85.1%, the use of wrong suture materials for fascia repair in 76.6%, while overweight in 68.1%.

Conclusion: The development of incisional hernia following cesarean section is uncommon but higher than previously reported. Many predisposing factors for incisional hernia may reduce the overall incidence of incisional ventral hernia when corrected.

Key words: incisional hernia, incidence, epidemiological factors.
Clinical examination of the patients was performed for all women, especially looking for the presence of incisional hernia (palpable incisional fascial defect, or visible bulge in the laparotomy incision).

Maternal demographics, obstetrical events, indication for caesarean section, delivery outcome, history of chronic cough, history of smoking, previous medical and surgical history were evaluated. Also perioperative data included type of anesthesia (general or spinal), operative time, blood transfusion, fever and local wound complications (cellulitis, infection, hematoma and dehiscence) were documented for each patient. All the data were compiled and continuous variables were analyzed using Student t-test.

**Results**

During the study period (2008-2010), 2,470 patients underwent caesarean section (either pfannenstiel or midline incision), 94 (3.8%) women developed incisional hernia, and 2,376 women (96.2%) did not develop incisional hernia. It followed midline incision in 84% patients and pfannenstiel incision in 16%. So the current incidence of incisional hernia post cesarean section amongst women attending surgical outpatient clinic in our hospital was 3.8%.

In addition, the study revealed that 28.5% of all incisional hernias developed in the first 6 months after the operation, and 55.8% after 1 year. The demographic, obstetric, medical characteristics of women who developed incisional hernia together with the anesthetic data and wound complications are summarized in Table 1.

Of 94 women who developed incisional hernia post cesarean section, five major associated risk factors were found to be of significant importance within this group: 79 patients (84%) had midline incisions, wound infections occurred in 67 patients (71.3%), previous one or more caesarean sections in 80 patients (85.1%), the use of wrong suture materials for fascia repair in 72 patients (76.6%), while overweight (body mass index > 25 kg/m2) in 64 patients (68.1%). Other factors (chronic cough, gestational diabetes, cigarette smoking, and perioperative blood transfusion were not significant).

**Discussion**

An incisional hernia can develop in the scar tissue around any surgery performed in the abdominal area, depending upon the location of the hernia; internal organs may press through the weakened abdominal wall. In the context of cesarean section, evagination of the wall, or incisional hernia, is one of the most prevalent complications. Despite numerous improvements over the years in suture materials and closure techniques, the incidence of incisional hernia has not diminished(9). There are insufficient and conflicting reports on the frequency of incisional hernias post cesarean section. Our study showed the current incidence of incisional hernia post cesarean section was 3.8%, which is comparable to the study of Adesunkanni AR et al(3) which found the incidence of 3.1% of total 701 patients who had caesarean sections during the period of the study, but higher than the Oscar Agüero(10) study which had an incidence of 1.3%.

They may develop months after the surgery or years after, usually because of inadequate healing or excessive pressure on an abdominal wall scar. Our study revealed that 28.5% of all incisional hernias developed in the first 6 months after the operation, and 55.8% after 1 year, similar to study of Höer J et al(11).

The major possible predisposing factors identified in this study are not much different from those reported elsewhere(12,13). Wound infection has continued to be an important risk factor. It was contributory in 71.3% of our patients; while the overall post-cesarean wound infection rate was 19% as shown by Koigi-Kamau R et al(14).

In our study incisional hernia post cesarean section developed in 84% of patients with midline incisions. This is in agreement with previous observations which showed that there is lower incidence of late incisional hernia after transverse compared with vertical incisions(15,16).

Our data revealed that the most important constant and independent factor for incisional hernia post cesarean section is the repeated frequency of caesarean section as it occurred in 80 patients (85.1%) in our study. With the increased occurrence of this operation, it is expected to increase the likelihood of hernia formation; this is inconsistent with another study that showed maternal mortality and morbidity in women who have two or more previous caesarean sections did not differ from the patients with one previous caesarean section(17,18).

Incisional hernia is expected in patients who have absorbable suture for fascia repair. It requires suture materials whose tensile strength will still hold until the fascia heals. As noted in our series (76.6%), herniation through the scar was more frequent, possibly due to use of the wrong suture materials for fascia repair. A consensus of these is that a running suture of the fascia with slowly absorbable or non-absorbable sutures results in the lowest incidence of incisional hernias(19).

The factors that increase the risk of incisional hernia are conditions that increase strain on the abdominal wall, such as obesity as overweight (body mass index > 25 kg/m2) occurred in (68.1%) in our study. Obesity clearly increases the risk of incisional hernia; therefore, we suggest that whenever possible, reduction of weight should be encouraged before laparotomies and incisional hernia repair in overweight patients(20).

Age, parity, gestational diabetes, chronic cough, cigarette smoking, and perioperative blood transfusion were found to not be associated with increased risk for hernia formation, in agreement with other studies in this area(21,22).

**Conclusion**

We can conclude from this study that the development of incisional hernia following cesarean section is uncommon but higher than previously reported. Although many predisposing factors for incisional ventral hernia are
patient-related, some factors such as type of primary closure, materials used and through a combination of health education and sound surgical technique with good wound care may reduce the overall incidence of incisional ventral hernia.

References
8. Alchalabi HA, Amarin ZO, Badria LF, Zayed FF. Does the number of previous caesarean deliveries affect maternal outcome and complication rates? East Mediterr Health J. 2007 May-Jun;13(3).

<table>
<thead>
<tr>
<th>Factors</th>
<th>No. of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midline incisions</td>
<td>79</td>
<td>84.0%</td>
</tr>
<tr>
<td>Wound infection</td>
<td>67</td>
<td>71.3%</td>
</tr>
<tr>
<td>Absorbable sutures</td>
<td>72</td>
<td>76.6%</td>
</tr>
<tr>
<td>Previous caesarean sections</td>
<td>80</td>
<td>85.1%</td>
</tr>
<tr>
<td>Overweight</td>
<td>64</td>
<td>68.1%</td>
</tr>
<tr>
<td>Chronic cough</td>
<td>10</td>
<td>10.6%</td>
</tr>
<tr>
<td>Gestational diabetes</td>
<td>5</td>
<td>5.3%</td>
</tr>
<tr>
<td>Perioperative blood transfusion</td>
<td>7</td>
<td>7.4%</td>
</tr>
<tr>
<td>Cigarette smoking</td>
<td></td>
<td>8.5%</td>
</tr>
</tbody>
</table>

Table 1: Major risk factors associated with incisional hernia in 94 patients


Levels of Total Fucose and Total Protein in Sera of Blood Groups and RBCs of Control, Minor and Major Thalassemic Patients

Tarik Al-Hakeem (1)  
Hamid Gaffoori Hasan (1)  
Zeyan Abdullah Ali (2)

(1) College of Education, Ibn al-Haitham, University of Baghdad  
(2) College of Education, Salahaddin University.

Correspondence:  
Prof. Dr. Hamid Ghaffoori Hasan  
College of Education, Ibn al-Haitham, University of Baghdad  
Baghdad, Iraq  
Email: gaforiiq@yahoo.co.uk

**ABSTRACT**

The aim of the present study is to measure the concentration of fucose and TP in sera and erythrocytes for minor and major thalassemic patients according to blood groups and compared those to healthy individuals. Total fucose, total protein and TF/TP ratio were determined in sera and RBCs according to their blood type groups for 40 control, (40 T minor) and (45 T major). No significant differences were found in TP in sera and RBCs of T minor, T major and controls considering each blood type group. A significant increase in TF level in sera of T major compared to TF for T minor and TF for control, also a significant increase in TF for T major compared to T minor. The RBCs of T major contain the highest level of TF followed by TF in RBCs for T minor compared to that in RBCs for control. Yet no significant difference in blood types groups for T minor patients was found. On the other hand high levels of TF in RBCs of type O blood group in T major was noticed compared to TF in RBCs of group A, B and AB. A significant increase in TF/TP in the sera of T major compared to the ratio in T minor and controls was noticed. The ratio of TF/TP in T major was significantly higher than that for T minor and controls.

**Keywords:** serum a-L-fucose, thalassemia, blood groups.

**Introduction**

Fucose (6-deoxy-L-galactose) is a monosaccharide that is found in glycoproteins and glycolipids present in vertebrates, invertebrates, plants, and bacteria. Fucosylation, which comprises the transfer of a fucose residue to oligosaccharides and proteins, is regulated by many types of molecules, including fucosyltransferases, guanosine diphosphate (GDP)-fucose synthetic enzymes, and GDP-fucose transporter(s). Fucosylation is one of the most important oligosaccharide modifications involved in cancer and inflammation (Miyoshi, et al 2012). The ABO blood group antigens are among the most well - known fucosylated glycans. The ABO system antigens are glycoproteins present on the surface of all cell membranes. The membrane surface will carry a protein into which oligosaccharide unit is attached. The H locus codes for fucosyl transferase, which adds fucose to a terminal galactose unit through alpha-1,2-linkage. This is the precursor for both A and B antigens.

L-fucose is an important component of the complex glycoconjugates of species ranging from bacteria to mammals. In humans, L-fucose is an essential component of N-linked and O-linked glycoproteins and glycolipids that mediate intracellular adhesion and recognition processes and there by play a role in embryogenesis, immunity, inflammation and metastasis of malignant cells. Specifically, L-fucose is present in the human ABO blood group antigens and Lewis (Le) glycans (Becker and Lowe, 2003).

The total protein of the plasma is about 7.0 - 7.5 g/dl. Thus, the plasma proteins comprise the major part of the solids of the plasma. The proteins of the plasma are actually a very complex mixture which includes not only simple proteins but also mixed or conjugated proteins such as glycoproteins and various types of lipoproteins in normal human plasma (Crook, 2006).
Experimental

Selection of subjects and blood sampling:
Ten ml of venous blood sample was obtained from 45 subjects of both sexes, with b-thalassemia major, 40 with b-thalassemia minor and 40 healthy individuals as the control group. All patients with major and minor thalassemia were admitted to the thalassemia center in Erbil and Ibn Al-Balady hospital in Baghdad for blood transfusion for b-thalassemia major and routine test for patients with b-thalassemia minor. The blood samples which were collected from all subjects were divided into three portions. The first portion was transferred into a plain tube containing (ethylene diamine tetra acetic acid disodium salt) (EDTA) as anticoagulant for plasma separation. The other portion was transferred into plain tube for serum separation. The third tube was used directly for hematological study HbF, HbA2, HbA and RBC. The first two portions were centrifuged at 3500 rpm for 10 minutes, then serum or plasma and buffy coat were removed by aspiration. Red blood cell hemolyzate was prepared by washing the RBCs three times with phosphate buffer saline (PBS) (pH 7.4)(0.02 M phosphate buffer, 0.123M sodium chloride) and vortexed with two ml normal saline and centrifuged. The supernatant (hemolyzate) was kept frozen until used.

Determination of blood group types
Principle:
The blood groups refer to the presence on human red blood cells of certain antigens, the blood group factors. One very important group of factors present on the red blood cells is the ABO system. The ABO group of a person depends on whether his/her red blood cells contain one, both or neither of the two blood group antigens A and B. There are, therefore, 4 main ABO groups: A, B, AB and O. Antibodies (agglutinins) for the antigens A and B exist in the plasma and these are termed anti-A and anti-B. The corresponding antigen and antibody are never found in the same individual since, when mixed, they form antigen-antibody complexes, effectively agglutinating the blood (Pesce and Kaplan, 1987).

Determination of total fucose in sera and RBC hemolyzate
Principle:
This method depends on a direct reaction of concentrated sulphuric acid with cysteine and the color product measured at 390nm and at 430nm. The differences in absorbances were directly proportional to d-glucose content of the solutions (Dische and Shettles, 1948).

Determination of total protein in sera and RBC hemolyzate:
Principle:
This method depends on the reaction of peptide bond of protein with cupric ion (Cu+2) in alkaline medium to form colored products whose absorbance is measured at 540 nm. (Oser, 1968)

Statistical analysis:
Data presented were the means and standard deviations. Student Z-test was used to compare the significance of the difference in the mean values of any two groups (P < 0.05) and was considered statistically significant.

The overall predictive values for the results in all studied groups were performed according to biostatistics by Daniel in 1987.

Results
Table 1, show the results of the total fucose, total protein and TF / TP ratio in sera of different types of blood groups for the control group. Total fucose for blood type O, A, B and AB groups were (14.34±1.75), (14.25±1.49), (14.28±1.44), (13.86±1.31) respectively.

The levels of total protein (g/dl) were (7.04±0.33), (7.13±0.17), (7.0±0.27) and (6.92±0.55) for blood type O, A, B and AB groups respectively. The ratio of TF/TP for O, A, B and AB were (2.03±0.3), (1.99±0.23), (2.04±0.63) and (2.00±0.52) respectively.

Table 2, show the results of different types of blood groups in sera of minor thalassemic group. Total fucose for blood type O, A, B and AB groups were (17.11±2.87), (16.06±2.03), (16.77±1.89) and (15.93±1.41). Total protein were (7.01±0.89), (7.21±0.27), (7.17±0.43) and (6.98±0.77) for O, A, B and AB blood groups respectively.

The ratio of TF/TP for O, A, B and AB blood groups were (2.75±0.37), (2.5±0.55), (2.52±0.19) and (2.46±0.48) respectively. There were significant differences in TF values between patients of minor thalassemic and controls among each blood group while no significant differences were found for total protein between each group of minor thalassemic patients compared to the same blood group in controls.

The ratio of TF/ TP showed a significant difference between the minor thalassemic patients of a specific blood type group to the same blood group of controls.

Table 3, (page 14) shows the results of TF, TP and TF/TP ratio in sera of major thalassemic patients with different type of blood groups.

TF for major thalassemic patients with O, A, B and AB blood groups were (36.88±4.22), (33.9±3.1), (33.28±3.52) and (30.21±1.99) respectively. Total protein levels for O, A, B and AB blood group were (6.98±0.88), (7.01±0.27), (7.0±0.12) and (7.1±0.37) respectively.

TF/TP ratio for major thalassemic patients of blood type O, A, B and AB were (5.19±0.73), (4.83±0.75), (4.75±0.66) and (4.21±0.73 respectively. Significant higher levels of total fucose in sera of major thalassemic patients of a specific blood group compared to the same blood group of control was found. A non significant relation was found for total protein of patient groups compared with controls. A significant elevation of TF/TP for major thalassemic patients of all blood types compared to controls was found.

Table 4 represents the results of total fucose, total protein and TF/TP ratio in RBCs of different blood types groups for the controls. Table 5, showed the results of total fucose, total protein and TF/TP ratio in RBCs of different blood types groups for the minor thalassemic patients. From Table 5 it was seen that there is a significant increase in TF of minor thalassemic RBCs hemolyzate of O group compared to control O group.
Table 1: Total fucose, total protein and TF / TP ratio in sera of different type of blood groups for control group.

<table>
<thead>
<tr>
<th>Blood Group</th>
<th>No.</th>
<th>TF mg/dl Mean±S.D.</th>
<th>TP g/dl Mean±S.D.</th>
<th>TF/TP mg/g Mean±S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>15</td>
<td>14.34±1.75</td>
<td>7.04±0.33</td>
<td>2.03±0.3</td>
</tr>
<tr>
<td>A</td>
<td>10</td>
<td>14.25±1.49</td>
<td>7.13±0.17</td>
<td>1.99±0.23</td>
</tr>
<tr>
<td>B</td>
<td>9</td>
<td>14.28±1.44</td>
<td>7.0±0.27</td>
<td>2.04±0.63</td>
</tr>
<tr>
<td>AB</td>
<td>6</td>
<td>13.86±1.31</td>
<td>6.92±0.55</td>
<td>2.00±0.62</td>
</tr>
</tbody>
</table>

P - represents value between minor and control blood groups.

Table 2: Total fucose, total protein and TF / TP ratio in sera of different type of blood groups for minor group.

<table>
<thead>
<tr>
<th>Blood Group</th>
<th>No.</th>
<th>TF mg/dl Mean±S.D.</th>
<th>TP g/dl Mean±S.D.</th>
<th>TF/TP mg/g Mean±S.D.</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>17</td>
<td>17.11±2.87</td>
<td>7.01±0.89</td>
<td>2.75±0.37</td>
<td>≤0.05</td>
</tr>
<tr>
<td>A</td>
<td>10</td>
<td>16.06±2.03</td>
<td>7.21±0.27</td>
<td>2.50±0.55</td>
<td>≤0.05</td>
</tr>
<tr>
<td>B</td>
<td>8</td>
<td>16.77±1.89</td>
<td>7.17±0.43</td>
<td>2.52±0.19</td>
<td>≤0.05</td>
</tr>
<tr>
<td>AB</td>
<td>5</td>
<td>15.98±1.41</td>
<td>6.98±0.77</td>
<td>2.46±0.48</td>
<td>≤0.05</td>
</tr>
</tbody>
</table>

Table 4: Total fucose, total protein and TF/TP ratio in RBC hemolyzate of different type of blood groups for control group.

<table>
<thead>
<tr>
<th>Blood Group</th>
<th>No.</th>
<th>TF mg/dl Mean±S.D.</th>
<th>TP g/dl Mean±S.D.</th>
<th>TF/TP mg/g Mean±S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>15</td>
<td>35.62±2.23</td>
<td>20.99±0.44</td>
<td>1.69±0.19</td>
</tr>
<tr>
<td>A</td>
<td>10</td>
<td>35.27±1.75</td>
<td>21.01±0.26</td>
<td>1.67±0.37</td>
</tr>
<tr>
<td>B</td>
<td>9</td>
<td>35.5±2.11</td>
<td>21.10±0.39</td>
<td>1.68±0.22</td>
</tr>
<tr>
<td>AB</td>
<td>6</td>
<td>35.1±2.0</td>
<td>21.30±0.14</td>
<td>1.64±0.15</td>
</tr>
</tbody>
</table>

Table 5: Total fucose, total protein and TF / TP ratio in RBC hemolyzate of different type of blood groups for minor group.

<table>
<thead>
<tr>
<th>Causes</th>
<th>&gt;60 years</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cataract</td>
<td>73</td>
<td>52%</td>
</tr>
<tr>
<td>Glaucoma</td>
<td>16</td>
<td>11%</td>
</tr>
<tr>
<td>Diabetic retinopathy</td>
<td>25</td>
<td>18%</td>
</tr>
<tr>
<td>Combined</td>
<td>10</td>
<td>7%</td>
</tr>
<tr>
<td>Corneal opacity</td>
<td>4</td>
<td>2.8%</td>
</tr>
<tr>
<td>Refractive errors</td>
<td>2</td>
<td>1.4%</td>
</tr>
<tr>
<td>ARMD</td>
<td>4</td>
<td>2.8%</td>
</tr>
<tr>
<td>Optic atrophy</td>
<td>3</td>
<td>2.1%</td>
</tr>
<tr>
<td>Others</td>
<td>3</td>
<td>2.1%</td>
</tr>
<tr>
<td>Total</td>
<td>140</td>
<td>100%</td>
</tr>
</tbody>
</table>

P represents value between minor and control blood groups.
human blood type A but not those of
lectins would agglutinate red cells of
type but not those of another. Certain
able to agglutinate the red cells of one
Boyd discovered that lectins can be
(Feizi et al, 1994). In 1945 William
acetylgalactosamine; in type O it is
of glycoprotein or glycolipid. In
sugars. For example, the difference
the specificity of the ABO blood group
until 1953 scientists discovered that
and the presence or absence of branch
points (Smetana et al, 1999). It was not
high levels of TF/TP ratio in each
group of thalassemic patients compared
to controls. There were significant
levels of TF/TP ratio in each
group of thalassemic patients
to the RBC hemolyzate of the
same blood type group. No significant
differences were found for total protein
of major thalassemic patients compared
to controls. Nature could employ sugars for
the synthesis of highly specific compounds
that can act as carriers of biologic
information monosaccharides which
can serve as “letters” vocabulary of
biologic specificity, where the words are
formed by variations in the nature of
the sugars present, the type of linkage
and the presence or absence of branch
points (Smetana et al, 1999). It was not
until 1953 scientists discovered that
the specificity of the ABO blood group
- system was determined by similar
sugars. For example, the difference
between blood types. A and B lies in
a simple sugar unit that sticks out
from the end of a carbohydrate chain
of glycoprotein or glycolipid. In
blood type A the determinant is N-
acetylgalactosamine; in type O it is
fucose and in group B it is galactose
(Feizi et al, 1994). In 1945 William
Boyd discovered that lectins can be
blood group specific; some lectins being
able to agglutinate the red cells of one
type but not those of another. Certain
lectins would agglutinate red cells of
human blood type A but not those of
O or B. It was Boyd who also was the
first to coin the term “Lectin” which is
“to choose”. The specificity of lectins
is so sharply defined that they can
differentiate among blood subgroups
(Shinebaum et al, 1987). There is
evidence that lectins may be involved
in the recognition between cells or cells
and various carbohydrate - containing
molecules. This suggests that they
may be involved in the regulating of
physiological functions (Polysalvo and
Taraov, 1992). The predominate
patients with type O blood group in
randomly selected major thalassemic
patients could be explained as for the
incidence of diabetics mellitus type I,
which has a higher incidence in type
B and A over O. What is especially
interesting is the fact that the percentage
of blood type A over blood type O in
diabetics appears to increase with age.
This association has been confirmed
in several independent studies, it may
be that the link with blood type A and
diabetics results from the application
of certain serum lectins to bind to both
the A antigen and the insulin producing
cells of the pancreas (Sidhu et al, 1988).
As with stress, high blood pressure
and myocardial disease, there are substantial
differences between blood type A and
blood type O diabetics with regard to the
(fluidity) of their blood. Blood type
A diabetics have significantly higher
levels of clotting factors in their blood
when compared with blood type O or
blood type B diabetics. This may be an
important risk factor in determining
chances of developing cardiovascular
complications due to diabetes (Dinten
Fass, 1977). In b - thalassemia major
there is failure of b- chain production
which leads to the precipitation of the
excess of a - chain in the developing
normoblast which causes membrane
damage and inflexibility leading to
premature RBC distortion and the
bone marrow production of abnormal
cells (ineffective erythropoiesis) that
contributes to the anemia because
the abnormal cells are destroyed in
the marrow (Fourie, 2003). The high
levels of TF in sera of blood type
O for controls, Tminor and Tmajor
compared to other blood type groups
among the same studied group could
be due to the fact of an a - fucosyl
transferase that adds fucose directly
to polypeptide chains (Wong et al,
2001), the H transferase expressed in
erythroid precursors that synthesizes a
structure known as the H antigen (blood
group O) by directing the addition of
fucose to terminal galactose residues on
oligosaccharide precursors decorating
several glycoproteins and glycolipids
(Low, 1993). The level of proteins
usually depends on the balance between
their synthesis and their catabolism
or loss from the body. Proteins are
synthesized in the liver, but the plasma
cells and lymphocytes of the immune
system system immobilize globulins and
proteins of the complement system are
synthesized by macrophages as well as
hepatic cells. Total protein levels may
be misleading and may be normal in
the face of quite marked changes in the
constituent proteins; only low albumin
levels are of clinical importance (Zilva
and Philip, 2002).

References
Becker, D.J. and Lowe, J.B.: “Review,
Fucose: Biosynthesis and Biological
Function in Mammals”: Glycobiology;
Crook M.A., Clinical chemistry &
metabolic medicine, 7th ed., Hodder
Dainel, W.W.: “Biostatistics: A
foundation for analysis in the health
Chem; 175: 595-603, (1948).
Feizi, T., Solomon, J.C., Yuen, C.T.,
Jeng, K.C., Frigeri, L.G., Hsu, D.K., and
Liu, F.: Biochemistry; 24: 33(20): 6342-
9, (1994).
Low, J.B.: Bailleirers Clin. Haematol; 6,
Miyoshi E., Moriwaki K., Terao N., Tan
C., Terao M., Nakagawa T., Matsumoto
Oser, B.L.: “Hawk’s Physiological
Pesce, A.J. and Kaplan, L.A., (Methods
of clinical chemistry), The C.V. Mosby
Polysalor, V.N., and Taraov, P.G.: Genetoka;
Table 6: Total fucose, total protein and TF / TP ratio in RBC hemolyzate of different type of blood groups for major group.

<table>
<thead>
<tr>
<th>Major Group</th>
<th>No.</th>
<th>TF mg/dL</th>
<th>Mean ± S.D.</th>
<th>P</th>
<th>P*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>20</td>
<td>36.88±4.22</td>
<td>6.98±0.88</td>
<td>&lt;0.05</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>A</td>
<td>9</td>
<td>33.93±3.1</td>
<td>7.01±0.27</td>
<td>&gt;0.05</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>B</td>
<td>9</td>
<td>33.20±3.52</td>
<td>7.00±0.12</td>
<td>&gt;0.05</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>AB</td>
<td>7</td>
<td>30.21±1.99</td>
<td>7.11±0.37</td>
<td>&gt;0.05</td>
<td>&gt;0.05</td>
</tr>
</tbody>
</table>

P represents value between control, minor and major blood groups.
P* represents P value between minor and major groups.

Table 3: Total fucose, total protein and TF / TP ratio in sera of different type of blood groups for major group.

<table>
<thead>
<tr>
<th>Major Group</th>
<th>No.</th>
<th>TF mg/dL</th>
<th>Mean ± S.D.</th>
<th>P</th>
<th>P*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>20</td>
<td>61.22±2.33</td>
<td>6.88±0.19</td>
<td>&lt;0.05</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>A</td>
<td>9</td>
<td>68.10±1.90</td>
<td>7.08±0.21</td>
<td>&gt;0.05</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>B</td>
<td>9</td>
<td>68.83±2.71</td>
<td>7.00±0.36</td>
<td>&gt;0.05</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>AB</td>
<td>7</td>
<td>64.96±1.89</td>
<td>7.00±0.36</td>
<td>&gt;0.05</td>
<td>&gt;0.05</td>
</tr>
</tbody>
</table>

P represents value between control, minor and major blood groups.
P* represents P value between minor and major groups.

(References continued)


Tracheostomy and Weaning

Qasim Khamaiseh

Correspondence:
Dr Qasim Khamaiseh
Department of anaesthesia and Intensive care
Royal Medical Services King Hussein Hospital, Jrdan
Tel :00962772197838
Email: qasimkhamaiseh@yahoo.com

ABSTRACT

This study was done to prove that the tracheostomized patient is more easy to be weaned from mechanical ventilation in comparison with non tracheostomized.

Patients and methods: After obtaining approval of the ethical committee, 105 adults patients were enrolled in this study. Two groups of patients were taken in the first group: those weaning from mechanical ventilators while the patients are on endotracheal tube and the second group weaning while the tracheostomy is being done, in patients who need a long stay in ICU.

Results: All patients weaned from ventilators while being tracheostomized were more easily and faster than the group of nontracheostomized patients.

Conclusion: Tracheostomy helps the ICU patients to be weaned from mechanical ventilation, faster than the patients on endotracheal tubes.

Keywords: Tracheostomy, endotracheal tube, weaning, mechanical ventilator

Introduction

Weaning of the patients from mechanical ventilation in ICU is one of the major problems, especially when long term intubation is needed. Therefore multiple new ventilator modes in are use, trying to wean the patients safely and early, but most of the time these have failed because of their initial bad condition. The need for high dose sedation to tolerate the endotracheal tube in non paralysed patients, to overcome the powerful laryngeal reflexes, so performing tracheostomy makes the weaning easy, more rapid and safer.

In our referral hospital, we admit all inpatients who need to be in ICU and we also accept the outpatients transferred from other hospitals.

As the advancement of medicine which helps the improvement of patient care and the development of ventilators, the majority of patients gain benefit from the medical support received in critical care units and they may be weaned easily from ventilators.

Early thinking on weaning from ventilator as soon as possible as the condition of the patients permit is our aim; to transfer them out of our busy unit to the intermediate care unit or to the ordinary wards in which the management can be further continued, especially in patients who need respiratory therapy.

Performing percutaneous dilatational tracheostomy at the bedside of the patients, allows this aim to be performed simply in critical care, because of its lesser complications and rapid procedure, assuring a secured patent airway always and permitting the suctioning and toileting of the lung easily and with less use of sedation, in comparison with the patients still on endotracheal tubes.

Table 1 (opposite page) shows the advantages of endotracheal intubation and advantages of tracheostomized patients.

In old medical books the authors recommend performing tracheostomy not earlier than 21 days. In the Otorhinolaryngology literature the advice is it is to be performed within the first three days of oral intubation for protection from damage of larynx mucosa and vocal cords.

The permanent change in voice like hoarseness occurs if the endotracheal tube remains from three days to one week. From these points of view they compared the ratio of benefit from tracheostomy to the mucosal injury and they fixed the period of 21 days for any endotracheal tube patients on whom it was required to perform surgical tracheostomy, to decrease the occurrence of permanent damage. However they did it only for seriously sick patients and those who needed intensive management. It was one of their concepts to transfer critical patients to the operating theatre and do a
surgical tracheostomy. The procedure carries a high risk and may harm the patients by increasing complications and mortality. Nowadays by performing this procedure at the bedside and rapidly it makes a big difference in the management of weaning patients from mechanical ventilators.

**Exclusion criteria:**
Patients with no hope of being extubated, because of their bad prognosis and patients with phrenic nerve damage.

**Patients and Method**
After obtaining the approval of the ethical committee, two groups of patients were taken into this study. The intention with the first group was to try to wean them from ventilators and to extubate them without doing tracheostomy; the second groups had tracheostomy firstly then the trial of

---

**Table 1:** Advantages of endotracheal intubation and advantages of tracheostomized patients.

<table>
<thead>
<tr>
<th>Advantages of endotracheal intubation</th>
<th>Advantages of tracheostomized patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Easy and rapid to insert</td>
<td>1- Easy and rapid to re-insert if displaced; allows less skilled nurse care.</td>
</tr>
<tr>
<td>2- Avoid acute surgical complication, bleeding and posterior tracheal wall injury</td>
<td>2- Reduces laryngeal damage</td>
</tr>
<tr>
<td>3- Low cost</td>
<td>3- Better toileting and suction</td>
</tr>
<tr>
<td>4- Avoid late surgical complication, infection, recurrent laryngeal nerve injury, and stomal stenosis</td>
<td>4- Decreased incidence of tube obstruction</td>
</tr>
<tr>
<td>5- Low risk of ventilator associated pneumonia</td>
<td>5- Less oral injury palate, teeth, tongue</td>
</tr>
<tr>
<td></td>
<td>6- Less sedation and analgesia, improves patient comfort</td>
</tr>
<tr>
<td></td>
<td>7- Better oral hygiene</td>
</tr>
<tr>
<td></td>
<td>8- Improves the ability to speak</td>
</tr>
<tr>
<td></td>
<td>9- Preservation of glottic competence: less aspiration and ventilator associated pneumonia</td>
</tr>
<tr>
<td></td>
<td>10- Allowing early eating</td>
</tr>
<tr>
<td></td>
<td>11- Low resistance to airflow, and decrease the dead space.</td>
</tr>
<tr>
<td></td>
<td>12- Lower the work of spontaneous breathing</td>
</tr>
<tr>
<td></td>
<td>13- Rapid weaning from mechanical ventilator</td>
</tr>
</tbody>
</table>

**Table 2:** Number of each group

<table>
<thead>
<tr>
<th>Intubated patients</th>
<th>Tracheostomized patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>45</td>
</tr>
</tbody>
</table>

**Table 3:** Number of patients upon their diagnosis

<table>
<thead>
<tr>
<th>Intubated patients</th>
<th>Tracheostomized patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neuromuscular disease (11)</td>
<td>(15)</td>
</tr>
<tr>
<td>Post cardiac respiratory arrest (13)</td>
<td>(14)</td>
</tr>
<tr>
<td>Postlong surgery (9)</td>
<td>(6)</td>
</tr>
<tr>
<td>Post trauma RTA (12)</td>
<td>(16)</td>
</tr>
<tr>
<td>After maxillofacial surgery (4)</td>
<td>(5)</td>
</tr>
</tbody>
</table>
weaning started (Table 2) in groups of patients suffering from a series of different conditions, like Neuromuscular disease, Post-respiratory cardiac arrest, Post long surgical procedure and trauma patients after road traffic accidents.

In the first group, when weaning is started by decreasing the sedation and stopping the muscle relaxants drugs, the irritability of patients, leading to increased work of breathing and blood pressure due to irritating laryngeal reflexes make the weaning difficult by the need to resume sedation or by adding antihypertensive agents respectively which means returning to the first square and trying to wean by adapting the tolerance of patients to oral intubation, which in the majority of patients takes place over a long period of time and may fail.

In the second group we were trying to wean patients from ventilators but after percutaneous tracheostomy is performed and the need of using sedation agents is decreased. Here by bypassing all laryngeal reflexes and by obtaining a permanent patent airway, there was no fear of obstructing upper airway, cleaning and toileting is more easy and all these conditions make the chance of weaning more possible and successful.

At all times for the tracheostomized group of patients, weaning was done more rapidly and easier than the non tracheostomized as shown previously.

**Discussion**

Tracheostomy is frequently done for ICU patients who become ventilator dependant, either permanently or temporally, for securing airway and for toileting of the secretions. Selection of the patients and the proper time to do this procedure is controversial (1).

The disadvantages of tracheostomy are the complications which occur during the procedure such as bleeding, permanent injury to the airway and the cost, but all these are widely accepted in comparison to the benefits of the procedure. Late in the last decade most of the studies show the perioperative complications are acceptable, and it shows that the risk of tracheal stenosis after tracheostomy is not more than subglottic stenosis after long term translaryngeal intubation (3,4,5).

The cost of this procedure can be less if it’s done in ICU as percutaneous dilatational tracheostomy in comparison to that done in the operating theater, and also if the patients are kept attached to ventilators or transferred to the ward (6).

Benefit obtained from tracheostomy in comparison to long term intubation, including the comfort of the patient, suctioning of trachea, less airway resistance, ability to mobilise patients early, speech, orally feeding, a more secured airway, all increase the incidence of weaning from ventilators which leads to early transfer from ICU. All ICU patients show a high degree of comfort after being tracheostomized and attached to their ventilators, they are comfortable with less irritability and have a feeling of hope that their free mouth may allow them to swallow, speak more easily and are aware because of less analgesia and sedation, more ability to be mobile and the hope of no more need of ventilators (7).

Weaning from ventilators may be promoted by decreasing the airways resistance which is one of the advantages of the tracheostomy tube in comparison with the endotracheal variety; it’s decreased by being shorter and having less curvature (8). Wright et al (9) demonstrated that the resistance of endotracheal tubes is greater when measured in vivo compared with in vitro. This means in the borderline patient’s lung they may obtain benefit from this decreasing of airways resistance and work of breathing which makes the weaning easier. Lesnik and his colleagues (10) showed that patients with multiple organ trauma, when the tracheostomy was done in the first 4 days of injury, they had shorter duration of ventilatory support by around one week. Early weaning in nearly all patients in comparison with a lower percentage (60%) in late tracheostomy, leads to less ICU stay. The ventilator associated pneumonia (VAP) is less with early tracheostomy and weaning the patients in comparison to late tracheostomies (11). Timing of tracheostomy in three studies was 3-4 days versus 14 days (12), less than 7 days versus more than 7 days (13), and 3-5 days versus to 10-14 days.

Cases tracheostomized in ICU as percutaneous dilatational tracheostomy cost less than the traditional tracheostomies in operating rooms.

**Conclusion**

Early weaning from ventilators has multifactorially dependent, but the early tracheostomy may be of help to wean and to disconnect from the ventilator to decrease the stay of patients in ICU and promote early rehabilitation out of ICU.

**References**

of endotracheal tube airflow resistance.
Am Rev Respir Dis 1989;140,10-16


12. Dunham, MC, LaMonica, C. Prolonged tracheal intubation in the trauma patient. Trauma 1984;24,120-124

ABSTRACT

Objective: The aim of this study is to identify the major causes of blindness in the Jordanian population among patients presenting to ophthalmology clinics and to classify these causes according to certain age groups.

Methods: This is a retrospective study conducted at Prince Hamzeh Hospital, Amman, Jordan during the period between July 2007 to July 2010.

Simple descriptive statistics (frequency and percentage) were used to describe the variables.

Results: The most common causes of blindness among the study group were cataract (49.1%), glaucoma (15.9 %) and diabetic retinopathy (13.3 %). Other causes were AMD (1.9%).

Glaucoma was the leading cause of blindness in the young age group, while cataract was the most common cause of blindness in middle and old age groups.

Conclusion: Understanding the causes of blindness, especially the preventable and curative causes, is important in decreasing the prevalence of blindness. This requires early referral of candidate patients from general practitioners to the ophthalmologist, and adopting a national ophthalmic educational program about the causes and prevention of blindness.

Our study showed that the major causes of blindness were cataract glaucoma, diabetic retinopathy; other causes were AMD. The late presentation of cataract patients, poor compliance of glaucoma patients and the lack of knowledge and ignorance of diabetic patients worsen the problem. Therefore, we advise to adopt a national ophthalmic educational program in order to decrease the incidence of blindness.

Key words: Blindness, Cataract, Glaucoma, Diabetic retinopathy.

Introduction

Global estimates of the burden of blindness and its multiple causes are difficult to obtain. A paucity of data and study design heterogeneity contribute to this problem.

Population-based studies have been performed in developed countries(1,2) but less often in underdeveloped areas where people are most affected. (3,4) Both sampling methods and definitions of visual impairment vary in studies performed by different groups on different world populations. Despite these limitations, reasonable estimates of the global burden of ocular disease have been obtained which aid in health service planning. This is especially valuable as the risk of death for the blind is expected to be 2 to 3 times higher than for non blind individuals (5).

Estimates of the relative causes of ocular morbidity may also be affected by the different ways in which ocular impairments are diagnosed. Some conditions such as cataract and trachoma can be identified with relative ease on physical examination. Other conditions such as age-related macular degeneration, glaucoma, and diabetes require examination and measurement with relatively sophisticated equipment. Despite these limitations, the World Health Organization (WHO) performed 2 recent surveys of global visual impairment(6,7) and they are the most cited.

In 1990, WHO estimated that 38 million persons were blind. (7) In a subsequent study in 2002 the estimate remained at 37 million persons. (6)

Interestingly, the ranking of the causes of blindness have changed over this 12-year period. (8) In the 1990 and 2002 estimates, cataract was the most common cause of blindness in the world by far. In fact, it was more common than all other causes combined. Although cataract affects all regions of the world, it does so asymmetrically, with developing countries shouldering a disproportionate amount of the burden. (9)

Despite the fact that cataract is treatable, it is projected to rise from the 37th to the 18th most important cause of global Disability Adjusted Life Years (DALYs) by the year 2020. (10) Other causes such as age-related macular degeneration and diabetic retinopathy are over represented in market economies. Diseases present in the earlier WHO survey such as trachoma, vitamin A deficiency, onchocerciasis, and leprosy dropped to a lower ranking or disappeared from the list entirely; a reflection of both programmatic efficacy and secular trend.

One important cause of visual impairment that has been absent from WHO and most other surveys is uncorrected refractive error. The definition of blindness used by the WHO and many other investigators is based on best corrected visual acuity.( 11) If presenting distance visual acuity were used rather than best corrected visual acuity, refractive error
might become the second most common cause of worldwide blindness, after cataract. (12) Fortunately, most refractive errors are treatable and are treated in many parts of the world. However, significant visual impairment due to uncorrected refractive error still afflicts many. The first step toward addressing this problem is adequately identifying and describing its presence.

This World Blindness issue of International Ophthalmology Clinics focuses on a few of the less common causes of visual disability. Some of these conditions have shown a marked decrease in prevalence in recent years outside the scope of targeted programs. The component causes of disease change over time, as new diseases appear and older diseases fade from view. Environmental, genetic, and behavioral changes contribute to this process. Although intervention programs with definable and measurable end points are worthy of our study, we also gain from defining, observing, and explaining secular trends in populations, especially in rare diseases or those that are declining in prevalence.

This study was conducted to describe and to identify the major causes of blindness in Jordanian population among patients presenting to ophthalmology clinics.

**Methods**

This is a retrospective study conducted at Prince Hamzeh Hospital, Amman, Jordan during the period between July 2007 to July 2010 on all patients who attended the ophthalmological clinic at our hospital, during that period.

Simple descriptive statistics (frequency and percentage) were used to describe the variables.

A complete history including age, sex, ocular and medical history, compliance to ocular medications, commitment to regular follow up visits, previous eye surgeries, and family history was taken from all patients.

Ophthalmological examination included Snellen visual acuity testing, anterior segment examination via slit lamp, and intraocular pressure measurement via Golmann application tonometer, refraction under cycloplegia followed by post cycloplegic testing and posterior segment examination after mydriasis via indirect ophthalmoscope. The patient was considered blind if his/her best-corrected visual acuity was less than 3/60 (or counting fingers at three meters) in the better eye according to the WHO definition of blindness.

Patients were divided into three groups according to their age in order to identify the causes of blindness in each group: Below 30 years, 30-60 years, and above 60 years

**Results**

During the period of this study there were a total of 310 blind patients who were examined.

The most common causes of blindness among the study group were cataract (49.1%), glaucoma (15.9%) and diabetic retinopathy (13.3%). Other causes were AMD (1.6%) in old ages. (Table 1).

The mean age of our patients was 52.6 years, with females being more than males in a ratio of 1.2:1.

Glaucoma was the leading cause of blindness in the young age group (below 30 years) followed by cataract and corneal opacity, while cataract was the leading cause of blindness in both middle and old age groups (30-60) and above 60 years, followed by diabetic retinopathy and glaucoma as shown in Table 2 - next page.

**Discussion**

Blindness is the functional end stage of many eye disorders. The occurrence and course of these disorders differs markedly throughout the world, and this is reflected by differences in the prevalence of blindness and visual impairment. International comparison of these data may help to provide insight into the risk factors associated with the blinding eye disorders and facilitate evaluation of therapeutic modalities and prevention programs.

The most common causes of blindness among our study were cataract (49.1%), glaucoma (15.9%), and diabetic retinopathy (13.3%). A study done at Prince Hamzeh Hospital in Amman showed cataract, diabetic retinopathy and glaucoma to be the leading three
### Table 2

<table>
<thead>
<tr>
<th>Causes</th>
<th>&lt;30 years</th>
<th>30-61 years</th>
<th>&gt;60 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cataract</td>
<td>15</td>
<td>61</td>
<td>73</td>
</tr>
<tr>
<td>Glaucoma</td>
<td>17</td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td>Diabetic retinopathy</td>
<td>3</td>
<td>16</td>
<td>25</td>
</tr>
<tr>
<td>Combined</td>
<td>6</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Corneal opacity</td>
<td>7</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Refractive errors</td>
<td>6</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>ARMD</td>
<td>0</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Optic atrophy</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Others</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>57</strong></td>
<td><strong>110</strong></td>
<td><strong>140</strong></td>
</tr>
</tbody>
</table>

### Table 3: Causes of blindness among patients < 30 years

<table>
<thead>
<tr>
<th>Causes</th>
<th>&lt;30 years</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cataract</td>
<td>15</td>
<td>26%</td>
</tr>
<tr>
<td>Glaucoma</td>
<td>17</td>
<td>30%</td>
</tr>
<tr>
<td>Diabetic retinopathy</td>
<td>3</td>
<td>5.2%</td>
</tr>
<tr>
<td>Combined</td>
<td>6</td>
<td>11%</td>
</tr>
<tr>
<td>Corneal opacity</td>
<td>7</td>
<td>12%</td>
</tr>
<tr>
<td>Refractive errors</td>
<td>6</td>
<td>11%</td>
</tr>
<tr>
<td>Optic atrophy</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Others</td>
<td>2</td>
<td>3.5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>57</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

### Table 4: Causes of blindness among patients between 30-60 years

<table>
<thead>
<tr>
<th>Causes</th>
<th>30-61 years</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cataract</td>
<td>61</td>
<td>55%</td>
</tr>
<tr>
<td>Glaucoma</td>
<td>15</td>
<td>14%</td>
</tr>
<tr>
<td>Diabetic retinopathy</td>
<td>16</td>
<td>15%</td>
</tr>
<tr>
<td>Combined</td>
<td>7</td>
<td>6.3%</td>
</tr>
<tr>
<td>Corneal opacity</td>
<td>3</td>
<td>2.7%</td>
</tr>
<tr>
<td>Refractive errors</td>
<td>5</td>
<td>5%</td>
</tr>
<tr>
<td>ARMD</td>
<td>1</td>
<td>0.9%</td>
</tr>
<tr>
<td>Others</td>
<td>2</td>
<td>1.8%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>110</strong></td>
<td><strong>100%</strong></td>
</tr>
<tr>
<td>Causes</td>
<td>&gt;60 years</td>
<td>%</td>
</tr>
<tr>
<td>----------------</td>
<td>-----------</td>
<td>-------</td>
</tr>
<tr>
<td>Cataract</td>
<td>73</td>
<td>52%</td>
</tr>
<tr>
<td>Glaucoma</td>
<td>16</td>
<td>11%</td>
</tr>
<tr>
<td>Diabetic retinopathy</td>
<td>25</td>
<td>18%</td>
</tr>
<tr>
<td>Combined</td>
<td>10</td>
<td>7%</td>
</tr>
<tr>
<td>Corneal opacity</td>
<td>4</td>
<td>2.8%</td>
</tr>
<tr>
<td>Refractive errors</td>
<td>2</td>
<td>1.4%</td>
</tr>
<tr>
<td>ARMD</td>
<td>4</td>
<td>2.8%</td>
</tr>
<tr>
<td>Optic atrophy</td>
<td>3</td>
<td>2.1%</td>
</tr>
<tr>
<td>Others</td>
<td>3</td>
<td>2.1%</td>
</tr>
<tr>
<td>Total</td>
<td>140</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 5: Causes of blindness among patients >60 years

<table>
<thead>
<tr>
<th>Country</th>
<th>First</th>
<th>Second</th>
<th>Third</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lebanon (14)</td>
<td>Cataract 41.3</td>
<td>Refractive errors 12.6</td>
<td>Corneal opacity 7.5</td>
</tr>
<tr>
<td>Japan (15)</td>
<td>Glaucoma</td>
<td>Cataract</td>
<td>R.P. degeneration 16</td>
</tr>
<tr>
<td>Ireland (16)</td>
<td>Macular degeneration 16</td>
<td>Glaucoma 16</td>
<td>Cataract 11</td>
</tr>
<tr>
<td>Netherlands (17)</td>
<td>ARMD</td>
<td>Glaucoma</td>
<td>Cataract</td>
</tr>
<tr>
<td>Scotland (17)</td>
<td>ARMD</td>
<td>Glaucoma</td>
<td>Cataract</td>
</tr>
<tr>
<td>Oman (18)</td>
<td>Cataract 30.5</td>
<td>Trachoma 23.7</td>
<td>Glaucoma 11.5</td>
</tr>
<tr>
<td>China (13)</td>
<td>Cataract 51.7</td>
<td>Macular degeneration 27.7</td>
<td>High myopia 10.3</td>
</tr>
<tr>
<td>India (4)</td>
<td>Cataract 64.4</td>
<td>Refractive errors 23.3</td>
<td>ARMD 2.9</td>
</tr>
<tr>
<td>Malaysia (19)</td>
<td>Cataract 39.1</td>
<td>Retinal disease 24.5</td>
<td>Refractive errors 4.1</td>
</tr>
<tr>
<td>Turkmenistan (20)</td>
<td>Cataract 54</td>
<td>Glaucma 25</td>
<td>-----</td>
</tr>
<tr>
<td>Tonga (21)</td>
<td>Cataract 68.4</td>
<td>Corneal opacity 15.8</td>
<td>Phthisical eye 10.5</td>
</tr>
<tr>
<td>Nepal (3)</td>
<td>Cataract 54</td>
<td>Glaucma 30</td>
<td>Uveitis 6</td>
</tr>
<tr>
<td>South Africa (3)</td>
<td>Cataract 55</td>
<td>Trachoma 10</td>
<td>Glaucoma 6</td>
</tr>
<tr>
<td>Kenya (3)</td>
<td>Cataract 38</td>
<td>Trachoma 18.7</td>
<td>Glaucoma 8.6</td>
</tr>
<tr>
<td>Australia (1)</td>
<td>AMD</td>
<td>Cataract</td>
<td>Glaucoma</td>
</tr>
</tbody>
</table>

Table 6: Main causes of blindness in selected countries, all ages
causes of blindness. Like in other developing countries, cataract constitutes the main cause of blindness and it is more prevalent in the rural population than in the urban population.(13)

We think that the relative low incidence of blindness caused by cataract in western countries is attributed to easy access to surgery, and early surgery, with fewer complications. In our community, especially in the rural areas, cataract patients are used to presenting late due to the false belief that cataract should only be extracted when it becomes mature. This false belief should be discouraged in order to decrease the incidence of blindness attributed to cataract.

Glaucoma was the second commonest cause of blindness being evident in 15.9% of our patients. It was the most common cause of blindness in patients younger than thirty years. Many patients with glaucoma present late as they are not aware of having it. Some patients were not committed to their regular follow up visits, while some others were not compliant to their ocular medications due to poor understanding of the disease process or from the unavailability of expensive eye drops.

Diabetic retinopathy contributed 13.3% of the causes of blindness and was the second commonest cause in middle and old age. Blindness caused by diabetes mellitus is considered to be preventable and curable if promptly dealt with. Patients with diabetes should be referred to the ophthalmologist as soon as they are discovered for regular follow up and to detect and manage any abnormality before developing advanced retinopathy. A substantial number of patients don’t believe in the benefits of laser treatment, and others find it difficult to travel a long way to receive laser treatment if it is not available in their region. This lack of knowledge and ignorance of the diabetic patients constitutes a major cause of loss of vision, which can be reduced by educating the patients about the complications of diabetes and the benefits of laser treatment.

Thirteen patients in our study were blind due to corneal opacities.

Trachoma is uncommon in Jordan, Lebanon, and Syria but still present in other countries such as Iraq and Oman and remains the second cause of blindness in Africa.

Refractive errors were seen in twelve patients. A national program for donation of organs after death had already been started in our country.

About 1.9% of the causes of blindness were due to age related macular degeneration with the majority being over 60 years. This is less prevalent than in western countries(16,17)

The main causes of blindness in patients less than thirty years of age were glaucoma, cataract, corneal opacities, refractive errors, and diabetic retinopathy. Blindness in childhood has far reaching implications for the affected child and family, and throughout life it profoundly influences educational, employment, personal and social aspects. Thus the control of childhood blindness has been identified as a priority by WHO for elimination of avoidable blindness.

Understanding the causes of blindness, especially the preventable and curative causes, is important in decreasing the prevalence of blindness. This requires early referral of candidate patients from general practitioners to the ophthalmologist, and adopting a national ophthalmic educational program about the causes and prevention of blindness.

References


Pomegranate seed oil ameliorates paracetamol induced hepato- and nephro-toxicity in rats

ABSTRACT

Background: Paracetamol (acetaminophen) is one of the most effective chemotherapeutic analgesic-antipyretic agents. Although hepatotoxicity is a common adverse-effect, impairment of renal function by paracetamol (PCT) is increasingly reported. Pomegranate seed oil (PSO) is shown to possess antioxidant activity. The study aim is investigating pomegranate seed oil for its protection of hepatic and renal damage in rats administered paracetamol in toxic doses.

Materials and Methods: Rats (n=18) were divided into three equal groups; a placebo group, paracetamol (PCT) group dosed orally with 750 mg/kg paracetamol and PSO-group given 1000 mg/kg pomegranate seed oil twice daily with 750 mg/kg PCT for fourteen days. Thereafter the rats were sacrificed; blood, liver and kidneys were taken for biochemical and histopathological analysis.

Results: PSO produced significant (P<0.05) hepato protection by decreasing hepato specific markers (serum glutamate oxalate transaminase and serum glutamate pyruvate transaminase, alkaline phosphatase, total serum bilirubin and malondialdehyde) and significantly increased the levels of glutathione (GSH) in the PSO-treated group. The levels of kidney function test parameters (urea, creatinine and uric acid) returned significantly to normal by treatment with PSO. Paracetamol plasma concentrations determined in the PSO-treated group were significantly lower than those in the PCT-group. The histopathological changes revealed protection by the PSO against paracetamol induced liver and kidney toxicity.

Conclusion: Pomegranate seed oil ameliorates hepato and nephrotoxicity of paracetamol over dosage.

Nidhal AK Mohammed Ali (1)
Shatha Zakr Saeed (2)

(1) Department of Pharmacology, Hawler Medical University, Iraq
(2) Department of Pathology, Hawler Medical College, Iraq

Correspondence:
Nidhal AK Mohammed Ali
Department of Pharmacology, Hawler Medical University, Iraq
Email: nabdulqader@yahoo.co.uk

Introduction
Paracetamol (acetaminophen) is a widely used analgesic and antipyretic drug in the world (1). Hepatic toxicity is most commonly associated with paracetamol overdose but renal tubular damage and acute renal failure can occur even in the absence of liver injury (2, 3, 4).

Hepatic toxicity is initiated by the formation of a reactive metabolite, which depletes glutathione and binds to cellular proteins, especially in mitochondria resulting in mitochondrial oxidative stress and subsequently to mitochondrial DNA damage (5).

Paracetamol nephropathy is found to be associated with a significant alteration in creatinine clearance, decrease in renal tissue concentration of glutathione and increased products of lipid peroxidation (5, 6).

Numerous medicinal plants and their formulations have been investigated in attempts to develop alternative therapeutic or prophylactic agents to protect against paracetamol toxicity with no side effects (5, 7, 8).

The medicinal use of pomegranate has been largely established in recent years, supported by numerous scientific research studies and different formulations of pomegranate now become available on the markets, such as fermented juice and cold pressed seed oil (PSO) (9, 10, 11).

Studies have shown the ability of different pomegranate components to scavenge free radicals and decrease markers of oxidative stress and lipid peroxidation in animals and increase plasma antioxidant capacity in humans (9, 12, 13, 14).

Published studies revealed that the major class of phytochemicals present in pomegranate is the polyphenols which act as primary antioxidants and free radical terminators (9, 10, 11, 15).
The following study was undertaken to evaluate the effect of pomegranate seed oil on hepatic and renal oxidative stress induced by toxic doses of paracetamol.

**Material and Methods**

**Experimental animals**

The study was carried out on Wistar albino male rats aged 14-16 weeks and weighing 150-200g. The animals (n=18) were grouped and housed in polyacrylic cages (38 x 23 x 10 cm) and maintained under standard laboratory conditions (temperature 25 ± 20°C) with dark and light cycle (12/12 h). The animals were fed with standard diet and fresh water was available ad libitum. All the animals were acclimatized to laboratory conditions for two week before starting the experiment. All procedures described were approved by the Ethical Committee, College of Medicine, Hawler Medical University, Kurdistan region, Erbil, Iraq.

**Treatment groups**

The rats were randomly divided into three equal groups. Group I treated orally with vehicle (corn oil) was kept as normal control.

Group II rats were given daily oral doses of paracetamol (PCT) at 750 mg/kg body weight and kept as toxin control.

Group III were treated with pomegranate seed oil (Pometone® liquecap, Vitane Pharma GmbH, Germany) twice daily at doses of 1000 mg/kg body weight by oral gavages an hour before administration of 750 mg/kg of paracetamol (16).

The dose of pomegranate seed oil was chosen according to the manufacturer’s instruction. On day 15, all animals were sacrificed 18 hours after the last treatment under diethyl ether anesthesia. Blood samples were collected by cardiac puncter into tubes and centrifuged at 3000 rpm for 15 minutes. The obtained serum samples were frozen at -80°C until analyzed of various biochemical parameters for liver and kidney function tests using commercially ARKRAY kits (Japan). Measurement of plasma paracetamol concentrations was carried out according to Shihana et al (17).

**Determination of oxidative stress markers**

The liver and kidney contents of reduced glutathione (GSH) and lipid peroxidation (malondialdehyde, MDA) of rats in each group were determined according to Ellman (18) and Ohkawa et al (19) respectively: A portion of the liver and the kidneys was quickly removed and separated from the surrounding tissues, washed twice with cold saline solution and stored at -80 degrees C until analyzed. Thereafter, the liver and renal cortical tissue were homogenized in cold potassium phosphate buffer (0.05 M, pH 7.4), centrifuged at 5000 rpm for 10 min at 4°C and the supernatant was used for the determination of GSH and MDA.

**Histopathological analysis**

A portion of the liver and kidney tissue from rats of each group were taken, fixed immediately in 10% formalin and used for investigation of light microscopy histopathological changes using routine staining by haematoxylin and eosin (H&E).

**Statistical analysis**

The results were given as the mean ± SEM. One-way analysis of variance (ANOVA) was used to compare data between groups for changes in serum hepatic, renal function and oxidative stress biomarkers using SPSS, version 18. The level of significance was set at P > 0.05.

**Results**

**Effect of pomegranate seed oil (PSO) on liver transaminase activity**

The serum transaminase activity of ALT, AST and alkaline phosphatase (ALP) and total serum bilirubin (TSB) in different groups of rats is shown in Table 1 and Figure 1. Paracetamol administration at 750mg/kg body weight resulted in a significant (P<0.01) elevation of hepatic biochemical markers of serum ALT, AST, ALP and TSB compared to normal control group. Administration of PSO significantly (P<0.01) reduced the activity of ALT, AST, ALP enzymes and TSB levels almost close to the levels in the control group. However, the reduction in ALP activity in the PSO group was insignificant (P<0.16) in comparison with the PCT group (Table 1 - next page).

**Effect of pomegranate seed oil (PSO) on kidney function test**

Serum urea and creatinine levels were significantly increased (P <0.01) in the PCT treated group when compared to those in control animals (Table 1; Figure 2), however treatment with PSO significantly reduced (p < 0.01) these levels compared to the PCT treated group. Whereas significant decrease (p>0.01) in uric acid levels found in the PCT treated groups, in comparison with those in control group animals, PSO treatment significantly (p < 0.01) recovered back the reduction in uric acid levels compared to PCT group to levels close to those of the control group (P<0.38).

**Effect of pomegranate seed oil (PSO) on antioxidant status**

**Glutathione (GSH) Level**

Figure 3 and Table 1 show the decrease in GSH levels in the liver and kidney tissues after treatment with PCT while administration of PSO along with PCT significantly increased GSH levels (P<0.01) compared to the PCT group.

**Lipid peroxidation levels (MDA)**

Administration of PCT (750 mg/kg body weight) up to two weeks resulted in a significant (P<0.01) increase in lipid peroxidation of liver and kidney of rat as measured by the estimation of MDA levels (Table 1). Administration of pomegranate seed oil with PCT significantly (P<0.01) modulated this increase (Figure 3).

**Determination of paracetamol concentration in plasma**

The mean concentration of paracetamol determined in plasma was significantly higher in the PCT group (36.1 mg/L) than in the PSO treated group 19.5 mg/L (Figure 4).

**Histopathological examination**

Reviewing the histopathological sections of rats’ liver tissue of the control group revealed normal hepatic cells with central vein (Figure 5) while in the PCT group, severe hepatotoxicity
Table 1: The effect of pomegranate seed oil on liver and kidney function tests and oxidative stress biomarkers in rats with paracetamol-induced toxicity.

<table>
<thead>
<tr>
<th>Biochemical parameters</th>
<th>Control (C)</th>
<th>Treatment Groups</th>
<th>Pomegranate seed oil (PSO)</th>
<th>Significance between groups (P value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALT (IU)</td>
<td>49.28±1.51</td>
<td>100.92±2.44</td>
<td>54.66±1.80</td>
<td>C&amp;PCT (&lt;0.0001) C&amp;PSO (&lt;0.07) PCT&amp;PSO (&lt;0.0001)</td>
</tr>
<tr>
<td>AST (IU)</td>
<td>42.12±2.37</td>
<td>97.35±4.72</td>
<td>49.45±1.50</td>
<td>C&amp;PCT (&lt;0.0001) C&amp;PSO (&lt;0.12) PCT&amp;PSO (&lt;0.0001)</td>
</tr>
<tr>
<td>ALP (IU)</td>
<td>156.3±10.36</td>
<td>253±8.89</td>
<td>168.67±9.17</td>
<td>C&amp;PCT (&lt;0.002) C&amp;PSO (&lt;0.37) PCT&amp;PSO (&lt;0.16)</td>
</tr>
<tr>
<td>TSB (μmol/l)</td>
<td>4.06±0.11</td>
<td>29.89±0.67</td>
<td>6.09±0.08</td>
<td>C&amp;PCT (&lt;0.0001) C&amp;PSO (&lt;0.006) PCT&amp;PSO (&lt;0.0001)</td>
</tr>
<tr>
<td>Urea (mg/dl)</td>
<td>14.16±0.47</td>
<td>38.83±1.49</td>
<td>16.5±1.33</td>
<td>C&amp;PCT (&lt;0.0001) C&amp;PSO (&lt;0.18) PCT&amp;PSO (&lt;0.0001)</td>
</tr>
<tr>
<td>Creatinine (mg/dl)</td>
<td>0.81±0.04</td>
<td>1.80±0.07</td>
<td>0.90±0.05</td>
<td>C&amp;PCT (&lt;0.0001) C&amp;PSO (&lt;0.34) PCT&amp;PSO (&lt;0.0001)</td>
</tr>
<tr>
<td>Uric acid (mg/dl)</td>
<td>3.21±1.8</td>
<td>2.13±1.3</td>
<td>3.02±1.5</td>
<td>C&amp;PCT (&lt;0.0001) C&amp;PSO (&lt;0.38) PCT&amp;PSO (&lt;0.001)</td>
</tr>
<tr>
<td>GSH (liver) (mmol/g)</td>
<td>4.46±0.14</td>
<td>1.85±0.09</td>
<td>4.28±0.22</td>
<td>C&amp;PCT (&lt;0.0001) C&amp;PSO (&lt;0.44) PCT&amp;PSO (&lt;0.0001)</td>
</tr>
<tr>
<td>GSH (kidneys) (mmol/g tissue)</td>
<td>3.88±0.08</td>
<td>2.11±0.13</td>
<td>3.6±0.31</td>
<td>C&amp;PCT (&lt;0.0001) C&amp;PSO (&lt;0.1) PCT&amp;PSO (&lt;0.0001)</td>
</tr>
<tr>
<td>MDA (liver) (nmol/g)</td>
<td>2.82±0.14</td>
<td>5.55±0.21</td>
<td>3.21±0.12</td>
<td>C&amp;PCT (&lt;0.0001) C&amp;PSO (&lt;0.11) PCT&amp;PSO (&lt;0.0001)</td>
</tr>
<tr>
<td>MDA(kidney) (nmol/g)</td>
<td>2.15±0.04</td>
<td>4.35±0.22</td>
<td>2.25±0.07</td>
<td>C&amp;PCT (&lt;0.0001) C&amp;PSO (&lt;0.07) PCT&amp;PSO (&lt;0.0001)</td>
</tr>
<tr>
<td>Plasma paracetamol concentration (mg/l)</td>
<td>0.0</td>
<td>36.1±2.7</td>
<td>19.5±0.7</td>
<td>PCT&amp;PSO (&lt;0.003)</td>
</tr>
</tbody>
</table>

Table 1: The effect of pomegranate seed oil on liver and kidney function tests and oxidative stress biomarkers in rats with paracetamol-induced toxicity.

was observed as severe zonal necrosis (centrolobular necrosis) and loss of nuclei (Figure 6), however in the PSO group, the hepatocytes showed less injury, with only mild necrosis with ballooning injury (Figure 7). The histopathological examination of kidney sections of the PCT group (Figure 9) showed clear evidence of features of cortical interstitial congestion and tubular necrosis including tubular epithelial degeneration, vacuolization, cell desquamation and necrosis with intraluminal cast formation mainly in the proximal tubules while normal tubules were observed in the control group (Figure 8) and minimal tubular changes including mild proximal tubular degeneration, epithelial vacuolization and desquamation were shown in the PSO group (Figure 10).

Discussion
Paracetamol (acetaminophen) is the most popular analgesic-antipyretic in use and severe liver injury and renal insufficiency is commonly reported...
Figure 1: Effect of treatment with pomegranate seed oil on serum hepatic transaminase activity, alkaline phosphatase and total bilirubin in rats with paracetamol (PCT)-induced toxicity. All values are mean ± S.E (n=6).

Figure 2: Effect of treatment with pomegranate seed oil on serum urea, creatinine, uric acid in rats with paracetamol (PCT)-induced toxicity. All values are mean ± S.E (n=6).

Figure 3: Effect of treatment with pomegranate seed oil on liver and kidney glutathione (GSH) and malondialdehyde (MDA) content in rats with paracetamol (PCT)-induced toxicity. All values are mean ± S.E (n=6).
Figure 4: The mean (±SEM, n=6) plasma concentration (mg/l) of paracetamol in paracetamol-treated group (PCT) and in pomegranate seed oil treated group (PSO).

Figure 5: Histopathology of liver sections of control group showing normal hepatic tissue (H & E, 250X).

Figure 6: Histopathology of liver sections of paracetamol-treated group showing severe hepatocytes necrosis (H & E, 250X).
Figure 7: Histopathology of liver sections of pomegranate seed oil-treated group showing mild hepatic injury with ballooning and vascular congestion (H & E, 250X).

Figure 8: Histopathology of kidney sections of control group showing normal tubules and glomeruli of the Kidney (H & E, 250X).

Figure 9: Histopathology of kidney sections of paracetamol-treated group showing severe necrosis mainly of proximal tubules (H & E, 250X).
in patients with paracetamol overdose (3, 20, 21).

Increased concentration of serum transaminase enzyme activity, total bilirubin, urea and creatinine indicate induction of liver damage and deterioration of renal function induced by paracetamol toxic doses (3, 5, 20). Such observation is consistent with numerous studies (5, 21, 22) and continuous investigations are carried out to explore the mechanisms underlying paracetamol overdose induced hepatic and renal damage (2, 23, 24, 25); also PCT overdose has been taken as a relevant model for studying hepato and nephrotoxicity (1, 5, 7, 8, 25).

The increase in ALP activity that remained insignificant (P<0.16) between the PSO and PCT group means that restoration of normal liver function was not complete and the process of hepatic cellular repair related to the activity of this enzyme is slow or may require longer duration or greater concentration of PSO to return it toward control levels (25, 26).

PSO reduction of significant increase in different hepatic enzyme activities and kidney function tests indicates that PSO can protect hepatic and kidney cells from damage produced by PCT overdose. This effect could be related to PSO antioxidant property (9, 27, 28). It is most probably that PSO bioactive polyphenol constituents act by scavenging reactive oxygen species and reduce oxidative stress (29) induced by accumulative toxic doses of paracetamol administered in the present study. The antioxidant property of pomegranate has also been elucidated by others (12, 13, 15).

The reduced glutathione content of liver and kidney in the PCT-treated group is most probably related to the accumulation of the reactive metabolite N-acetyl- p-benzoquinone imine (NAPQI) of PCT, that covalently binds with the macromolecules on cellular protein especially in mitochondria (2,3). This results in mitochondrial oxidant stress that leads to mitochondrial DNA damage and ultimately causes oncotic necrotic cell death and organ dysfunction upon high PCT dose (25, 30, 31, 32).

Glutathione depletion has been reported in relation to PCT over dosage which causes impairment of liver and kidney antioxidant defense mechanisms and permits enhanced free radical-induced liver and kidney damage in paracetamol toxicity (5, 30).

NAPQI is the toxic metabolite of PCT and is detoxified generally by the enzyme glutathione-S-transferase. This enzyme is found abundantly in both liver and kidney and a conjugate NAPQI with reduced glutathione (3, 33). When a high concentration of PCT is administered and glutathione stores in the liver and kidney are decreased, consequently hepatotoxicity and nephrotoxicity develop (21, 3, 33). If hepatotoxicity develops, then the amount of NAPQI which should be conjugated in the kidneys increases and the risk of PCT- nephrotoxicity increases in parallel (3).

Recent in vitro and in vivo studies focus on PCT at doses below those required to produce hepatotoxicity, cause direct neurotoxic effects on rat brain neurons to which the general PCT toxicity syndrome is related and that this effect is due to increased expression and activity of cytochrome P-450 isoenzyme (CYP2E1) in the brain by which a fraction of the administered PCT is metabolized (23, 34).

MDA is a good indicator of the degree of lipid peroxidation which is suggested to be a sequel of oxidative stress and depletion of liver and renal GSH (5), accordingly this may explain the significant (P<0.01) increased MDA levels in liver and kidney tissues found in this study which has been demonstrated also in other studies (35,36).

The concentration of intracellular GSH is more likely the key determinant of the extent of PCT-induced renal injury, thus, interest has been focused on compounds that act as antioxidants and are capable of stimulating GSH synthesis (4, 5, 37).

The recovery of liver and kidney oxidative stress biomarkers to levels close to those in the control group shown by PSO, is most probably related to its constituents of polyphenol that have been shown to possess potent in vivo and in vitro antioxidant properties (28).
PSO most probably manifests this effect by increasing glutathione levels in the hepatic and kidney cytosol and mitochondria that detoxify the highly reactive and cytotoxic (NAPQI) metabolite formed and replace the depletion in glutathione induced by PCT over dosage (27). 

Besides PSO antioxidant effect, an anti-inflammatory effect has been proposed for PSO (27, 38) to which part of the effects of PSO in this study could be attributed since prostaglandin endoperoxidase synthase (PGES) is hypothesized to be involved in PCT -induced renal toxicity (39,40). Furthermore, PSO is shown to limit lipid peroxidation consequences induced by NAPQI- hepatocyte damage that triggers the activation and the inflammatory responses of the immune system within the cells and induces release of inflammatory mediators such as cytokines, chemokines, and reactive oxygen and nitrogen species that contribute to the progression of liver injury (40,41).

Other evidence of restoring liver and kidney cell damage is the apparent reduction of plasma paracetamol concentration in PSO relative to the PCT group which elucidate the repair in the process of paracetamol metabolism and excretion of the higher concentration of paracetamol attended in the PCT group.

In addition, the histopathological findings describes that PSO dosing ameliorated liver necrosis and renal tubular damage that was induced by PCT overdose, although did not recover completely but regeneration is clear and most probably PSO could protect the damage of these tissues if used as a supplement and prophylactic antioxidant in situations where PCT is administered chronically (43) or for patients with other risk factor such as nutritional impairment, chronic liver disease, those with concurrent alcohol consumption, and those with increased activity of the cytochrome P-450 enzyme system (23, 44, 45).

Conclusion
According to the biochemical and histopathological findings, the present study reveal that pomegranate seed oil might be a potential candidate against experimentally induced paracetamol hepatic and nephrotoxicity via its antioxidant and free radical-scavenging properties.

Acknowledgment
Thanks are due to Dr. Sardar Noori, the assistant Professor in the department of Biochemistry, College of Medicine, Hawler Medical University for his generous assistance in the determination of oxidative stress biomarkers.

References


Foot drop, atypical presentation for ADEM. A case report in Kuwait and review of the literature

Introduction
Acute disseminated encephalomyelitis (ADEM) is an immune mediated acute inflammatory demyelinating disease of the central nervous system [1]. It is a monophasic disease that usually occurs following a viral infection but may appear following bacterial or parasitic infection, vaccination or even appear spontaneously [2]. ADEM comprises a group of neurological disorders which coexist in various combinations in the same patient or might present clinically as an isolated disease [3].

Case Report
A 42 year old gentleman was admitted to Jahra hospital with inability to walk appropriately for 10 days. He described having left foot drop with a steppage gait on walking associated with paraesthesia in the left leg up to the left nipple. He didn't report any history of fever, malaise, myalgias, headache, nausea, vomiting, and impairment of consciousness or seizures. He was an ex-smoker 6 months ago with no prior history of cardiovascular risk factors. His three young children had developed chickenpox a few weeks earlier; from them he caught the infection 20 days prior to his recent complaint. The patient himself was previously well with no history of having had chickenpox in the past, nor being vaccinated.

On examination, he was generally well. He had a diffuse fading skin rash on his upper body involving the face, neck and the trunk (Figure 1 - next page). His intellectual function and cranial nerves were normal. He had grade 2 weaknesses of the left ankle and toe dorsiflexors with positive Babinski sign. He had grade 4+ motor powers in the rest of the left lower limb. The deep tendon reflexes were normal. There was no limb ataxia or disequilibrium. There was subjective diminution of pain, temperature, and vibratory sensations over the left leg up to the knee. Urgent CT brain was done to rule out central causes and it showed faint hypodense area affecting white matter of the left parietal lobe (Figure 2). MRI of the brain showed multiple hypo/hyperintense pattern on both T1/T2 involving the white matter of both parietal lobes posterior, left occipital lobe as well as minute foci at both substantia nigra of the mid brain, lateral to the red nuclei (Figure 3). The spinal cord showed multiple similar lesions, notably opposite C3 -C6 levels as well as dorsal spinal cord at D4 and D9 -D10 levels (Figure 4). Nerve conduction velocity (NCV) and electromyogram (EMG) were normal. The diagnosis was made as Post-Chickenpox Acute Disseminated Encephalomyelitis (ADEM). He responded dramatically to IV methylprednisolone with complete recovery of his motor powers and normalization of his gait on the 5th dose of steroids.

Correspondence:
Gehan Hamdy
Assistant professor of Internal Medicine, Cairo University, Egypt
Tel: 0096599279742
Fax: 0096524575201
Email: gegehamdy@hotmail.com

ABSTRACT
Acute disseminated encephalomyelitis (ADEM) is an immune mediated neurological disorder characterized by inflammation of the brain and spinal cord caused by damage to the myelin sheath. ADEM may occur in association with a viral or bacterial infection, as a complication of inoculation or vaccination, or without a preceding cause. Onset of the disorder is sudden. We have reported a 42 year old Kuwaiti gentleman who presented with left foot drop and paraesthesia. ADEM complicating chickenpox infection was found to be the underlying cause. We based our diagnosis of ADEM in this case on the typical

Key words: Chickenpox complications, ADEM, Post infectious demyelination
Figure 1: Diffuse fading skin rash on his upper body involving the face, neck and the trunk

Figure 2: CT brain shows faint hypodense area affecting white matter of left parietal lobe

Figure 3
MRI of the brain shows multiple hypo/hyperintense pattern on both T1/T2; the white matter of both parietal lobes posterior, left occipital lobe as well as minute foci at both substantia nigra of the mid brain, lateral to the red nuclei.
Discussion
We have reported a patient presenting with ADEM complicating chickenpox. We based our diagnosis of ADEM in this case on the typical antecedent post infectious presentation, MRI findings of the brain and spinal cord.

Our patient’s initial presentation was weakness in the left ankle dorsiflexors manifested with left foot drop and left lower limb paresthesia which seems first to be due to multilevel radiculopathy and peripheral nerve involvement. However the presence of positive Babinski sign together with multifocal neurological signs, both motor and sensory, reflected the multifocal cerebral and spinal cord involvement in this case.

The spectrum of neurological symptoms and signs in ADEM is broad, reflecting widespread central and peripheral nervous system (PNS) involvement. Neurological dysfunction generally occurs within 3–6 weeks of the triggering event and may appear abruptly or may progress over several days [4-5]. Neurological complications caused by chickenpox are estimated to be approximately 0.01-0.03%. Despite Cerebellar ataxia being reported to be the commonest neurological complication caused by chickenpox, our patient didn’t have cerebellar involvement. Other reported neurological complications include encephalitis, transverse myelitis, aseptic meningitis; Guillain Barre Syndrome, meningoencephalitis, ventriculitis, optic neuritis, post-herpetic neuralgia, herpes zoster ophthalmicus, delayed hemiparesis, peripheral motor neuropathy, cerebral angiitis, Reye’s syndrome and facial paralysis are observed rarely [6-7].

The most important alternative diagnosis to ADEM is multiple sclerosis (MS). Sometimes at the initial presentation, the two disorders cannot be distinguished with absolute certainty. Because subsequent attacks of MS may not occur for months or years, prolonged follow-up is required to establish a diagnosis [8].

A case of report of a patient who presented with painless foot drop as a first presentation of multiple sclerosis (MS) had been published, which was diagnosed late after being thoroughly investigated for peripheral etiology [9].

In our case the diagnosis is considered straightforward when ADEM occurs after an exanthem or immunization. A clear cut latent period between systemic symptoms and neurological illness favors ADEM along with the typical pattern of diffuse and multifocal involvement of both the central nervous system and peripheral nervous system and the characteristic MRI appearance [4]. ADEM is usually a self-remitting disease; approximately 70% of the patients show complete recovery [10].

Conclusion
Chickenpox is usually diagnosed clinically on the basis of the characteristic rash and successive crops of lesions. Particular attention should be directed to unprotected adults who are susceptible to serious complications of chickenpox. Public health intervention is required to raise the public orientation for communicable diseases complications. The reported case demonstrates that foot drop may be the main presenting manifestation for central rather than peripheral etiology; the presence of upper motor neuron signs necessitates urgent MRI brain scan for proper diagnosis and treatment without delay.

References


