Adequacy of completion of clinical microbiology laboratory request forms in a Jordanian hospital

Nasser M. Kaplan, MBChB, MPhil.

The clinical microbiology laboratory request form performs a pivotal role between the physician and the laboratory, and it is indeed surprising that very little appears to have been written regarding this rather important document. Providing appropriate information will help the referral laboratory do the top-notch work the clinician wants. Providing better clinical information will help the microbiologist produce an improved interpretative report and include comments with a beneficial effect on diagnosis and treatment. This study was designed to evaluate the appropriateness with which the Clinical Microbiology Laboratory request forms were completed, and to make recommendations aimed at improving information given on such forms. A 3 phase prospective study was conducted from 1 May through to 31 July 2003 in Princess Imran Research and Laboratory Sciences Centre of King Hussein Medical Centre, Amman, Jordan, an 800 bed general hospital. In the first month (Phase 1), out of 1376 request forms observed for defects in their completion, 243 (17.7%) were defective. Each inappropriately completed request form was counted as one, regardless of the number of defects it contained. A baseline descriptive analysis of the defects observed in completion of these request forms was performed (Table 1). In the second month (Phase 2), a quality improvement plan was designed and implemented to improve the adequacy of completion of request forms. The plan included educational and administrative interventions such as presentations, telephone calls, ward visits and corridor discussions, strict application of rejection criteria of the defective request forms and the inappropriate specimens, distribution of instructive written memoranda illustrating the ideal completion of the request forms and requiring the clinician to sign these forms. In the third month (Phase 3), out of another 1389 request forms observed for defects in their completion, only 28 (2%) were defective. It was noted that a substantial proportion of the defective request forms were completed and signed by unauthorized nonphysicians. The overall defects observed before and after the implementation of the quality improvement plan were compared. The Chi square test showed a statistically significant difference (p<0.0001). There was approximately 16% reduction in the rate of inappropriately completed request forms after the interventions. We concluded that application of this plan to encourage the adequate completion of clinical microbiology laboratory request forms is effective and highly recommended because of its cost-effectiveness and the resulting better clinical microbiology service. Such plan is laboratory cost-effective as a result of the implementation of strict specimen rejection criteria, the rational targeted diagnostic approach, the omission of unnecessary laboratory procedures and minimizing the production of duplicate reports requested in cases of omission of patient’s details such as patient’s ward or consultant’s name. The plan is also hospital cost-effective as early diagnosis and use of proper antibiotic will shorten the patient’s hospital stay and reduce cost of unnecessary antibiotics. Nevertheless, cost savings cannot be the sole rationale of an intervention on test orders and the primary goal should be improvement of clinical relevance of the ordering. The simplest, easiest, cheapest, and probably most effective way to guide physicians to use microbiology laboratory correctly is by designing test request forms properly. The design of new request form is a low cost intervention that combines both economic and clinical requirements in reducing the ordering of unnecessary laboratory tests. Microbiologist should decide on the type, quantity, and quality of information that is required to reflect a clinical consultation. The creation of necessary, efficient forms at the lowest cost is possible and the salient points of forms analysis, design, and control have been recently addressed. Several studies have shown that 25-40% of all tests sent to the laboratory are unnecessary. Demand management is ordering the most appropriate tests that will facilitate good clinical management of the patient with minimal wastage of resources. Review of the literature suggests that some of the greatest

Table 1 - Comparison between the defects in microbiology laboratory request forms before (first month) and after (third month) the implementation of quality improvement plan.

<table>
<thead>
<tr>
<th>Defects</th>
<th>First month (n=243)</th>
<th>Third month (n=28)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unauthorized nonphysicians signature</td>
<td>211</td>
<td>23</td>
</tr>
<tr>
<td>Omission of patient’s details such as location</td>
<td>68</td>
<td>7</td>
</tr>
<tr>
<td>Omission of source of specimen</td>
<td>179</td>
<td>21</td>
</tr>
<tr>
<td>Absence of clinical information</td>
<td>156</td>
<td>17</td>
</tr>
<tr>
<td>Illegible entries</td>
<td>45</td>
<td>5</td>
</tr>
<tr>
<td>Unconventional abbreviations</td>
<td>17</td>
<td>2</td>
</tr>
</tbody>
</table>

Conclusion: The design of new request form is a low cost intervention that combines both economic and clinical requirements in reducing the ordering of unnecessary laboratory tests. Microbiologist should decide on the type, quantity, and quality of information that is required to reflect a clinical consultation. The creation of necessary, efficient forms at the lowest cost is possible and the salient points of forms analysis, design, and control have been recently addressed. Several studies have shown that 25-40% of all tests sent to the laboratory are unnecessary.
gains of demand management have been in the field of microbiology whose request forms offer the greatest potential. Additional assistance to clinician may be rendered by the current trends in clinical microbiology practice to limit the processing of inappropriate specimens. Good communications between the medical, nursing, infection control, and laboratory staff has proved vital for safe and successful implementation of the strategy of performing only a very limited range of microbiological tests in patients with hospital acquired diarrhea.4 However, it should be emphasized that the selective reduction of test ordering should not result in underutilization or failure to order a potentially indicated test. The availability of information technology and greater acceptability of evidence based medicine will probably be the most important factors in making demand management a reality. Therefore, it is highly recommended to routinely and regularly inspect both the Clinical Microbiology Laboratory request forms for proper completion before their recording, and the accompanying specimens for appropriate quality before their processing. In our institution, all necessary measures to increase awareness of the importance of clinical microbiology laboratory request forms between healthcare workers should be applied. These measures should include institutional surveys, active enhanced communications, laboratory user’s manual, education and audit. A survey of laboratory users focused clinicians’ attention on the microbiology service, raised the profile of the laboratory, and resulted in improved communications and a better understanding of customer needs. The direct participation of laboratory professionals in discussions on patient care resulted in an enhancement of the overall quality of the health care provided to the patient.5 It is also advantageous to produce and distribute a regularly updated microbiology laboratory user’s manual or handbook including guidelines for completion of microbiology request form, specimen collection, rejection criteria of defective incomplete forms and inappropriate specimens, specimen transport arrangements, turnaround times and availability of interpretative and medical advice. Continuing medical education such as regular clinico-pathological meetings for hospital doctors and interactive induction courses for junior doctors are recommended. The clinical skills laboratories or centers are new promising trends in medical education.6 Medical audit is the systematic, critical analysis of the quality of medical care, including the procedures used for diagnosis and treatment, the use of resources, and the resulting outcome and quality of life for the patient. Medical audit has been established for many years in most of the pathology disciplines and has been reviewed specifically with regards to medical microbiological audit. The re-design of microbiology request form, the demand management strategy, the increased awareness plan and the computerization of the laboratory are pivotal measures for the development of the diagnostic and clinical microbiology service in our institution.

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References

Outbreak of multidrug resistant
Acinetobacter in the neonatal intensive care unit

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Nosocomial or hospital acquired infection rates are higher in the intensive care areas of the hospitals and newborn nurseries. The possible reasons could be the age, decrease immunity, use of invasive measures like intubation, central lines, total parenteral nutrition, catheters and wide spread use of antibiotics.1,2 Although, both gram positive and gram-negative organisms are reported to be involved, recent reports have suggested the emergence of the rare gram-negative organisms. One example is the recent report of outbreak of Enterobacter cloacae species in a neonatal intensive care unit.3 This report describes a rapid spread of another rare gram-negative multi-resistant

bacterium, the *Acinetobacter* species, in one of the busiest Neonatal Intensive Care Unit (NICU) of the Eastern Province of Saudi Arabia. *Acinetobacter* are very short rod shaped gram-negative bacteria. They are strict aerobes and grow well between 30-32°C. They are free living ubiquitous saprophytes. Their pathogenecity is usually limited to opportunistic infections. Their colonization has been reported to occur with prolong intubation of neonates. In various reports, different materials have been implicated as source of *Acinetobacter* infection, namely indwelling catheters, fat emulsions, suction bottles, aerosols and air conditioners. This risk of infection is not only limited to the preterm infants, term infants have also been shown to be affected. Recently, we observed a rapid spread of *Acinetobacter* organism among the neonates admitted to the NICU at King Fahd Hospital of the University (KFHU). The organism was isolated from the transtracheal aspirate cultures in seven intubated neonates during a period of one week. The organism was sensitive to Imipenem only and resistant to Amikacin, Ampicillin, Augmentin, Aztreonam, Ceftazidime, Ceftriaxone, Ciprofloxacain, Gentamycin, Pipracillin, Tetracycline, Tobramycin and Trimethoprim/Sulfamethoxole. The multi-resistant nature of the organism and rapidity of spread prompted us reporting this case series. The summary of the cases is depicted in Table 1. Aggressive measures were taken to combat this outbreak till. No further cases were reported. The unit was closed for all new admissions. The whole unit was cleaned by the House Keeping Department using general dusting, scrubbing, and wiping. No Fumigation was performed. Suspected cases were isolated. Index of suspicion for gram negative sepsis was increased and appropriate antibiotics were initiated early in suspected cases of sepsis. Improved hygienic measures including strict hand washing protocol with hygiene barrier nursing was enforced. Cultures were sent from air, wash basins, ventilatory tubing and suction catheters. No source could however be identified. Thorough cleaning and disinfection of the unit was carried out by using disinfectants namely presept, Johnson & Johnson (Dichloroisocyanurate sodium salt 50%) and Metricide 28, Metrix (2.5% Glutaraldehyde). Central sterilization supply department (CSSD) disinfected the used equipment by using presept solution. In the present case series, fortunately the blood cultures in all the cases were negative thus positive endotracheal/transtracheal aspirate culture were taken as colonization of the endotracheal tube rather than infection. Despite all possible methods, we were unable to find the possible link or source of the organism. However, as the outbreak was noted after the transfer of one of the sick neonate from another hospital (case 1), we assume this case to be the ‘index case’ and the possible source of the organism. Also, it was difficult to associate colonization with increased mortality, as the cause of death in these infants were directly linked to the primary disease namely pulmonary hypertension (case 1), prematurity (case 2) and diaphragmatic hernia (case 3). The infection control policy and protocol at the NICU of KFUH is followed very strictly. Thus, this type of outbreak could only be explained by the fact that at the time of this outbreak the unit was overcrowded. As we are the only governmental NICU providing level III care for neonates in whole Al-Khobar area, many times we had to compromise to accommodate the increasing demand. This highlights on the need for expansion in the NICU services at this region. The main aim of this report is to emphasize on the nature

<table>
<thead>
<tr>
<th>Gender</th>
<th>Place of birth</th>
<th>Mode of delivery</th>
<th>Birth weight (g)</th>
<th>GA</th>
<th>Apgar score</th>
<th>Diagnosis</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Outborn</td>
<td>CS</td>
<td>4400</td>
<td>40</td>
<td>5/8</td>
<td>PPHN</td>
<td>Died</td>
</tr>
<tr>
<td>Female</td>
<td>Inborn</td>
<td>NSD</td>
<td>1210</td>
<td>31</td>
<td>3/5</td>
<td>Prematurity</td>
<td>Died</td>
</tr>
<tr>
<td>Female</td>
<td>Inborn</td>
<td>NSD</td>
<td>2830</td>
<td>40</td>
<td>8/9</td>
<td>Diaphragmatic hernia</td>
<td>Died</td>
</tr>
<tr>
<td>Female</td>
<td>Inborn</td>
<td>NSD</td>
<td>2380</td>
<td>34</td>
<td>9/10</td>
<td>Prematurity</td>
<td>Discharged home</td>
</tr>
<tr>
<td>Male</td>
<td>Inborn</td>
<td>NSD</td>
<td>1310</td>
<td>29</td>
<td>8/9</td>
<td>Prematurity</td>
<td>Discharged home</td>
</tr>
<tr>
<td>Male</td>
<td>Inborn</td>
<td>NSD</td>
<td>1310</td>
<td>31</td>
<td>5/9</td>
<td>Prematurity</td>
<td>Discharged home</td>
</tr>
<tr>
<td>Male</td>
<td>Inborn</td>
<td>CS</td>
<td>2180</td>
<td>33</td>
<td>7/9</td>
<td>Prematurity</td>
<td>Discharged home</td>
</tr>
</tbody>
</table>

CS - cesarean, NSD - normal spontaneous delivery, birth weight, GA - gestational age in weeks
Apgar score in one and 5 minutes, PPHN - persistent pulmonary hypertension

**Table 1** - Summary of the cases.
of the rapid progressive colonization of NICU with multi-resistant organism. This further reiterates on the importance of the policy of rationing the use of antibiotics and strictly following the infection control measures.

In conclusion, this report highlights on the phenomenon of quick spread of the rare multi-resistant organism in an intensive care setup. Neonates being relatively non-immune are more susceptible. Thus, vigilant care should be given to the infection control policies to prevent these outbreaks.

References


Acute gluteal abscess due to chloroquine injection in Sudanese pregnant woman

Ishag Adam, MD. Mustafa I. Elbashir, MD, PhD.

We have previously reported on the different manifestations of severe malaria among pregnant Sudanese women, which involved all parities and showed a wide range of presentations including cerebral malaria.1 In Sudan, falciparum malaria has been reported as one of the main causes of maternal mortality.2 A 24-years-old woman, gravida 3, para 2, pregnant for 24-weeks presented to New Halfa Teaching Hospital complaining of fever, sweating, headache, and pain in the region of chloroquine injections which she received 9 days earlier. On admission her weight was 63 kg, the pulse was 90/minute, the blood pressure was 110/70 mm Hg, the temperature was 38.9°C, with clear chest and there was no palpable spleen or liver. The patient’s hemoglobin was 9.5 g/dl and her urine was clear. Right-sided gluteal abscess 6 x 8 cm was found. After preparation (fasting), the abscess was drained under general anesthesia (Ketamine). Ampicillin/clavulanic acid 500mg was given at first intravenously and then continued orally for 7 days. Staphylococcus aureus was isolated and it was sensitive to Ampicillin/clavulanic acid. After the appearance of healthy granulation tissue in the third day the patient was discharged to continue the dressing at the health center and to come for follow up in the antenatal clinic until delivery, which was normal vaginal delivery in hospital. The birth weight was 2.9 kg. This pregnant woman presented with fever, moreover the abscess was drained under general anesthesia; both the fever and anesthesia are hazardous during pregnancy. Such rare complication (abscess at chloroquine injection site) should be considered among the causes of morbidity and mortality associated with malaria or its treatment. Chloroquine is very popular in Sudan and is usually self prescribed drug with a common belief that the injectable form is more effective than the orally administered drug. Thus, in Sudan, chloroquine has been reported earlier to cause massive necrosis and associated with gluteal abscess especially when given at home or with minimum care for contamination.4,5

References

Pseudocyesis and infertility

Saad E. Dafallah, MBBS, MJOK.

Pseudocyesis or phantom pregnancy is a psychological disorder in which the women firmly believes her to be pregnant and manifests the symptoms and signs of pregnancy. This definition excludes cases of willful and conscious deception. Since the symptom complex of pseudocyesis is erroneously, commence antenatal care of such patients. Between the 1 of January 1994 up to 31 December 1999 twenty cases of pseudocyesis were collected among patients who had previously being investigated and managed for reproductive failure at Wad Medani Teaching Hospital, Sudan. All the 20 women believed that they were pregnant and had obvious pregnancy fantasies. They all had history of secondary amenorrhea, ranging from 4-19 months, and all complained of abdominal enlargement. In all cases clinical examination revealed a non-gravid uterus. In 5 cases, the uterus was enlarged by leiomyomata of varying sizes, with the largest consistent with cyesis of 24 weeks. Urine specimens sent for pregnancy test were negative in all cases. Ultra-sound confirmed the absence of pregnancy of all cases. The case is a 34-years-old married woman which is a typical case of pseudocyesis. She was the first of her husband’s 3 wives. In order to inherit a share of his wealth, it was mandatory to have children. The other 2 wives had 4 and 5 children. The patient have not succeeded in bearing and offsprings despite all investigations and management. She attributed her delayed fertility to other 2 wives, but she believed now she is pregnant. When the patient presented, she gave a history of amenorrhea of 14-months, abdominal distension, previous nausea and vomiting, weight gain and fetal movements. Her native doctor had informed her that her pregnancy was due to witchcraft and evil spirits involved by others in an attempt to ensure that the baby would not survive. To overcome the malign influence, she had performed several rituals at great expense, although her husbands provided only limited financial supports. On examination, her breasts appeared full with little secretion, the abdomen was distended these are rhythmical movements of the abdominal wall simulating fetal movements. The uterus could not be palpated their abdomen and the fetal heart sound was not audible by the sonic aid. Pelvic examination revealed normal genital organs. Ultrasound revealed no fetal parts. Pituitary function tests revealed normal prolactin, (332 μL) normal Follicle stimulating hormone (FSH) (22.8 μL) and normal leuteinizing hormone (LH) (29.2 μL). estradiol is slightly decreased and serum progesterone is slightly elevated (36.5 n mol/L) suggesting luteal phase. Nevertheless the patient still strongly believed that she is pregnant and intended to continue her follow up with her native doctor. Tow months later she presented claiming that her pregnancy was so prolonged that she is afraid to loose her fetus. She was then admitted to the hospital. She was seen 3 times by the psychiatrist who failed to convince her that she is not carrying any pregnancy. Two weeks later the symptoms and signs of pregnancy disappeared spontaneously. The total number of patients complaining of reproductive failure who were seen during the period 1 January 1994 up to 31 December 1999 was 3200. The number of patients with pseudocyesis was 20, giving an incidence of 1: 160. Table 1 shows the presenting features of pseudocyesis, the age of patients ranged between 26-44 years, 12 patients were nulliparous, 5 gave birth to 3-5 but had no living child. The remaining 3 patients have got 3 female children but were desirous of a pregnancy hoping that they would give birth to a male child. The period of primary or secondary infertility ranged between 6-20-years and all patients were desperately eager to have a child. Six patients believed that witchcraft have prevented their pregnancies from developing to maturity and the remaining 14 patients will more than 9 months amenorrhea believed that spontaneous labor had

<table>
<thead>
<tr>
<th>Signs or symptoms</th>
<th>n (%)</th>
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<tbody>
<tr>
<td>Amenorrhea</td>
<td>20 (100)</td>
</tr>
<tr>
<td>Belief of pregnancy</td>
<td>20 (100)</td>
</tr>
<tr>
<td>Abdominal enlargement</td>
<td>20 (100)</td>
</tr>
<tr>
<td>Fetal movement</td>
<td>16 (80)</td>
</tr>
<tr>
<td>Nausea and vomiting</td>
<td>12 (60)</td>
</tr>
<tr>
<td>Enlarge uterus</td>
<td>5 (25)</td>
</tr>
<tr>
<td>Softness of the cervix</td>
<td>2 (10)</td>
</tr>
</tbody>
</table>

Table 1 - The distribution of the presenting features of pseudocyesis.
been inhibited through witchcraft. All patients were of low socioeconomic groups and were under emotional and psychological stress as consequence of their relative infertility. Pseudocyesis, although not common in gynecological practice, has been recognized since the time of Hypocrates, Aldrich. In our study the incidence of pseudocyesis is 1:160 this comparable with 1:170 found by Hennessy. Sterile unions are, therefore, invariably associated with considerable stress, especially when the other women in polygamous marriage succeeded in bearing children. In a monogamous marriage infertility is often license for extra marital affairs. Pseudocyesis is classic evidence of the supreme role of the central nervous system on gonadal function through a rather complex and poorly understood psycho-neuro-endocrine interaction Bray et al. The reproductive potential of a woman is very important for social, psychological and economic reasons, so it is not unheard of to detect psychosomatic symptoms due to infertility. All patients presented with amenorrhea, belief of pregnancy and abdominal distension, these results are similar to the results of Meza et al who demonstrated the above symptoms in all his patients. Reactive depression is of importance in the genesis of pseudocyesis and subsequent manifestations of symptoms and signs could be a defense against psychological disorder. The predominance of women of low socioeconomic of group in this series may imply that educated or sophisticated women can compensate for their childlessness by the diversional pursuits, although occasionally varying degrees of depression and mood alteration do occur. Pseudocyesis had no definitive effect on the pituitary function, our case had normal level of prolactin, FSH, LH, and this is consistent with what Padayachi et al found in his study. Unless the symptoms and sign of pregnancy disappeared spontaneously, it is very difficult to convenes the patient.

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References


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Garden cress (lepidium sativum) seeds as oral contraceptive plant in mice

Maysoon Sharief, CABOG, Zainab H. Gani, MSc.

In recent years, health care professional working in family planning programs have paid increasing attention to the quality of care and informed choice. The provider for contraceptive choice is most likely to be concerned with the ability of a method to prevent pregnancy, with its safety in use and with its feasibility in terms of provision. Choice of a method will of course be concerned with its efficacy, safety and side effects. Oral contraceptive method is widely used in the world to control birth. But individual variation in absorption and metabolism account for small minority of failures. Therefore, and under the circumstances of the economic sanction, a search for herbaceous plant should be discovered and should be used without hard effort and counseling.

BALB/c mice bred in the College of Science, University of Basrah, Iraq were used throughout this work. They were 4-5-weeks-old. The mice were maintained in an animal house which is kept at a 25°C. Plastic cages with silk covers and saw dust beddings were used and were cleaned twice a week. Thirty-two female mice were divided randomly into 2 groups. Sixteen mice of one group were fed for one week on a standard diet containing garden cress (lepidium sativum) seeds. At 4 pm daily and throughout the experiment, each 4 female mice were transferred and caged with 2 males until the morning (9 am) of the next day. Then, female mice were isolated in the cages alone for experimental feeding. The other group of 16 female mice was fed on standard diet only and left with a male mice as a control.

In statistics, chi square (X²) was used as a test of significance. The differences were considered significant at a level of p<0.05.

The rate of contraception was (100%) in female mice in the treated group. In which, each mice received one g/day of oral dose of garden cress seeds. However, the total interruption of oral dose for the same female mice were recovered with the ability for pregnancy (80%). The pregnancy rate for the control group was (100%). Statistically, the difference was not significant (p>0.05). Similarly,
there was an insignificant relationship in the body weights between the treated and control groups ($p>0.05$). Also, there was no difference in the pregnancy period, weight and number of newborn between the treated and controlled female mice.

The contraceptive usage of oral lepidium sativum seeds was efficient compared to other known contraceptive methods. Different contraceptive means had a various failure rate and it ranged from 0.1-8%. In addition, lepidium sativum seeds did not cause any harmful effects or deaths on the treated mice. While most of the contraceptive methods cause different complications including nausea, cardiovascular disease, liver malfunction, psychological stress, bleeding, inflammation of the pelvic organs, cancer, neoplasm and increased body weight. Sexually transmitted diseases and reproductive tract infections often occur among contraceptive users. Lepidium sativum has less need for counseling which is another advantage for its use.

This study demonstrated that the lepidium sativum seeds are efficient to prevent pregnancy in laboratory mice and the purification of the main ingredient(s) is essential for future application in human beings. Also, its effects on the reproductive organs, endocrine organs and others should be investigated.

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