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Reducing Hospital Lengths of Stay by Discharge Status

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Abstract

This study evaluated the impact of length of stay reduction by discharge status in the hospitals of Syracuse, New York. It focused on the two largest inpatient services, adult medicine and adult surgery, between 2008 and 2018. In the Syracuse hospitals, the adult medicine mean length of stay declined by 0.12 days, resulting in a savings of 14,154 patient days during the ten year period. The adult surgery mean stays declined by 0.91 days, resulting in a savings of 22,639 patient days. The reductions in stays were accompanied by differences in utilization by discharge status. For discharges to self care, the changes in mean stays increased the number of days saved for adult medicine from 5111 to 13,264 and the number of days saved for adult surgery from 4355 to 13,862. These changes were brought about through internal efficiencies within the hospitals. For discharges to nursing homes, the reductions in stays caused the number of excess days to decline from 13,631 to 8695 for adult medicine and from 9150 to 5075 for adult surgery. These changes were brought about through cooperative efforts with long term care providers in the community.

Keywords

Hospitals, Hospital Admissions, Health Care Expenses

1. Introduction

In the United States, efforts are continuing to focus on improving the efficiency of health care. The expenses of health care have become a major burden for government through Medicare and Medicaid, as well as for businesses and individuals through private insurance. In recent years, efforts to address this issue have,
at best, slowed the rate of increase of these expenses [1] [2].

Although health care payers operate at national and regional levels, the delivery of care is carried out at the local level. Most communities support acute care, ambulatory care, and long term care resources. Both the availability and use of these resources determine the outcomes of health care and the costs of producing them [3] [4].

From the standpoint of utilization, improving the efficiency of hospitals and other health care providers involves reducing inpatient admissions and lengths of stay. Reducing admissions is essential for health care payers because it is directly associated with reimbursement, but reducing stays is more important for providers because it is directly related to outcomes and internal expenses [5] [6].

Within health care at the community level, hospitals provide acute episodic care. As a result, hospital care is followed by other modalities such as long term care, ambulatory care, or informal supports. For many patients, the efficiency of acute care depends on the effectiveness of the other types of care in the continuum [7] [8].

It has been demonstrated that reducing hospital inpatient lengths of stay frequently has a positive impact on outcomes. It lowers the possibility of post admission complications and other adverse events [9].

Reducing stays has a major impact on hospital efficiency. By expediting the movement of patients to other levels of care, it reduces the expenses of inpatient hospitalization.

2. Population

This study described the impact of reducing inpatient hospital lengths of stay by discharge status in the metropolitan area of Syracuse, New York during a 10 year period. This area includes three large acute care facilities, Crouse Hospital (18,935 inpatient discharges excluding well newborns—2017), St. Joseph’s Hospital Health Center (24,886 inpatient discharges—2017), and Upstate University Hospital (32,411 inpatient discharges—2017).

The hospitals provide primary and secondary acute care to a service area with a population of approximately 600,000. They also provide a full range of services to the eleven county Central New York Health Service Area with a population of 1,400,000.

Historically, the Syracuse hospitals have worked cooperatively to improve the efficiency of care in the service area. They have maintained an inpatient admission rate per capita that is the lowest of the metropolitan areas in New York State. They have also implemented programs that have contributed to reductions in inpatient lengths of stay [10].

3. Method

This study focused on inpatient lengths of stay by discharge status for the combined Syracuse hospitals between 2008 and 2018. It included stays for adult
medicine and adult surgery, the inpatient services with the largest discharge volumes.

Within these services, the study identified hospital stays by discharge status. This indicator included discharges to self care (home without organized services), nursing home (skilled nursing facilities), home health care (home through certified home health agencies), expired and interhospital transfers.

Reductions in hospital stays for discharges to self care were implemented through programs within the hospitals because organized post discharge services were not required. The need for these programs was evaluated through monitoring of the times needed to deliver inpatient acute care services. For adult medicine, these programs included expediting the provision of diagnostic tests and medication regimes. For adult surgery, these programs included early ambulation of patients after procedures and expediting the provision of therapies. This discharge status usually involved relatively large numbers of discharges and short stays per patient.

Reductions in hospital stays for discharges to nursing homes were implemented through programs that moved patients at the end of their stays to post discharge services in the community. For adult medicine and adult surgery, these programs included the identification and monitoring of difficult to place patients in all of the hospitals. They also included the implementation of subacute programs involving long term acute care services such as intravenous antibiotic therapy and extensive wound care in nursing homes. These subacute and complex care programs were developed through cooperation with long term care providers. These programs usually involved relatively limited numbers of discharges and long stays per patient.

The utilization data for the combined hospitals were identified with simple descriptive statistics for each discharge status and hospital service by even numbered years. Numbers of discharges were also identified for each year.

The annual mean lengths of stay for the combined hospitals were compared with the severity adjusted national average stays for each discharge status and inpatient service. Severity adjusted national averages were identified using the All Patients Refined Diagnosis Related Group System developed by 3M™ Health Information Services. The differences between hospital stays and national average stays were multiplied by numbers of hospital discharges to identified patient days differences. Positive differences indicated hospital stays above national averages. Negative differences indicated hospital stays below national averages.

The impact of the reductions in hospital stays for adult medicine and adult surgery were estimated in utilization, including numbers of patient days and average daily censuses eliminated for the hospitals. They were also quantified as the estimated expenses of elimination of this utilization.

4. Results

The first part of the study focused on length of stay reduction in the Syracuse
hospitals for adult medicine patients. Related data are summarized in Table 1.

The lengths of stay data for adult medicine were affected by the implementation of medical observation regulations for Medicare patients in October 2013. As a result of these regulations, a number of Medicare patients were moved from inpatient to observation status. Consistent with that change, the study data identify a reduction in discharges and an increase in mean stays for adult medicine in the Syracuse hospitals beginning in 2014.

The data in Table 1 demonstrated that the total mean length of stay for adult medicine in the Syracuse hospitals declined by 0.12 days, from 4.98 to 4.86 days, between 2008 and 2018. This produced a change from 8843 excess days to 5311 days saved annually, resulting in the elimination of 14,154 patient days and an average daily census of 38.8, compared with severity adjusted national averages. The data also demonstrated that, since implementation of the Medicare observation regulations, the adult medicine mean length of stay declined by 0.58 days, from 5.44 to 4.86 days between 2014 and 2018.

The study data demonstrated that the largest numbers of patients for the Syracuse hospitals involved discharges to self care. This population involved 14,603 - 19,247 patients during the period of the study. As a result of programs that improved efficiency within the hospitals, mean length of stay for this population declined from 3.53 to 3.47 days between 2008 and 2018. This change increased the number of days saved annually from 5111 to 13,264. The data also demonstrated that after the implementation of the Medicare observation regulations, the mean length of stay for discharges to self care increased from 4.18 to 4.27 days because patients at lower severity of illness had been moved to observation status.

The data in Table 1 demonstrated that the largest numbers of adult medicine patients with excess stays in the Syracuse hospitals were those discharged to nursing homes. Between 2008 and 2018, the mean length of stay for these patients increased from 7.40 to 7.62 days. After implementation of the medical observation program by Medicare and initiatives involving the hospitals and area nursing homes, the mean length of stay declined by 1.26 days, from 8.88 to 7.62. This resulted in a reduction in the number of excess days for this population from 13,631 to 8695, an average daily census of 13.5.

The adult medicine data also indicated that the reduction of hospital stays for discharges to home care decreased the number of excess days for this discharge status from 5191 to 1326 and increased the number of days saved for deaths/transfers from 542 to 2176 during the period of the study. These efficiencies were related to hospital wide efforts to reduce lengths of stay, rather than specific programs.

The second part of the study focused on reduction of hospital stays for adult surgery patients in the Syracuse hospitals. Related data are summarized in Table 2.

Adult surgery patients were not involved with medical observation, so the continuum of utilization for this service was consistent between 2008 and 2018.
The data in Table 2 demonstrated that, during this period, the mean length of stay for adult surgery patients declined by 0.91 days, from 6.23 to 5.32 days, between 2008 and 2018. This resulted in a change from 11,724 excess days to 10,915 days saved, eliminating 22,639 patient days and an average daily census of 62.0 days in the hospitals.

The study data demonstrated that the largest numbers of adult surgery patients were discharged home with self care. This discharge status accounted for 10,000 - 12,500 patients annually. As a result of the implementation of programs that improved efficiency within the hospitals, the mean length of stay for this population declined from 3.53 to 3.05 days between 2008 and 2018. This change increased the annual number of days saved from 4355 to 13,862.

The study data also demonstrated that the largest numbers of patients with excess stays in the Syracuse hospitals were those discharged to nursing homes. Between 2008 and 2018, the mean length of stay for these patients increased from 10.50 to 10.58 days. During this period, the severity of illness of these patients increased at a rate higher than the severity adjusted national average. This resulted in a decline in the number of excess days for this discharge status from 9150 to 5075.

Table 1. Inpatient adult medicine mean lengths of stay by discharge status, Syracuse hospitals, 2008-2018.

<table>
<thead>
<tr>
<th>Number of Discharges</th>
<th>Jan-Dec 2008</th>
<th>Jan-Dec 2010</th>
<th>Jan-Dec 2012</th>
<th>Jan-Dec 2014</th>
<th>Jan-Dec 2016</th>
<th>Jan-Oct 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self Care</td>
<td>14,603</td>
<td>17,752</td>
<td>19,247</td>
<td>18,152</td>
<td>17,574</td>
<td>16,581</td>
</tr>
<tr>
<td>Home Care</td>
<td>6409</td>
<td>6368</td>
<td>7655</td>
<td>6867</td>
<td>6543</td>
<td>6630</td>
</tr>
<tr>
<td>Nursing Home</td>
<td>4932</td>
<td>5056</td>
<td>5008</td>
<td>4957</td>
<td>5434</td>
<td>4969</td>
</tr>
<tr>
<td>Deaths/Transfers</td>
<td>2583</td>
<td>3067</td>
<td>3339</td>
<td>3443</td>
<td>3478</td>
<td>3066</td>
</tr>
<tr>
<td>Total</td>
<td>28,527</td>
<td>32,243</td>
<td>35,249</td>
<td>33,419</td>
<td>33,029</td>
<td>31,246</td>
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<table>
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<th>Mean Lengths of Stay</th>
<th>Jan-Dec 2008</th>
<th>Jan-Dec 2010</th>
<th>Jan-Dec 2012</th>
<th>Jan-Dec 2014</th>
<th>Jan-Dec 2016</th>
<th>Jan-Oct 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self Care</td>
<td>3.53</td>
<td>3.60</td>
<td>3.62</td>
<td>3.81</td>
<td>3.61</td>
<td>3.47</td>
</tr>
<tr>
<td>Home Care</td>
<td>5.84</td>
<td>6.38</td>
<td>6.24</td>
<td>6.40</td>
<td>5.81</td>
<td>5.70</td>
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<tr>
<td>Nursing Home</td>
<td>7.40</td>
<td>8.20</td>
<td>8.31</td>
<td>8.88</td>
<td>7.80</td>
<td>7.62</td>
</tr>
<tr>
<td>Deaths/Transfers</td>
<td>6.43</td>
<td>6.83</td>
<td>6.56</td>
<td>7.21</td>
<td>5.97</td>
<td>6.11</td>
</tr>
<tr>
<td>Total</td>
<td>4.98</td>
<td>5.18</td>
<td>5.14</td>
<td>5.44</td>
<td>4.98</td>
<td>4.86</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Self Care</td>
<td>−5111.05</td>
<td>−7366.36</td>
<td>−10778.32</td>
<td>−10528.16</td>
<td>−11247.36</td>
<td>−13264.80</td>
</tr>
<tr>
<td>Home Care</td>
<td>5191.29</td>
<td>6559.04</td>
<td>5511.60</td>
<td>4669.56</td>
<td>2617.20</td>
<td>1326.00</td>
</tr>
<tr>
<td>Nursing Home</td>
<td>9420.12</td>
<td>11932.16</td>
<td>11318.08</td>
<td>13631.75</td>
<td>11248.38</td>
<td>8695.75</td>
</tr>
<tr>
<td>Deaths/Transfers</td>
<td>−542.43</td>
<td>184.02</td>
<td>−1435.77</td>
<td>378.73</td>
<td>−2399.82</td>
<td>−2176.86</td>
</tr>
<tr>
<td>Total</td>
<td>8843.37</td>
<td>11285.05</td>
<td>4934.86</td>
<td>8020.56</td>
<td>0.00</td>
<td>−5311.82</td>
</tr>
</tbody>
</table>

Source: Hospital Executive Council.
The adult surgery data also indicated that the reduction of hospital stays for discharges to home care increased the number of days saved for this discharge status from 3218 excess days to 1817 days saved and increased the number of days saved for deaths/transfers from 3757 excess days to 159 days saved during the period of the study. These efficiencies were related to hospital wide efforts to reduce lengths of stay, rather than specific programs.

5. Discussion

This study evaluated the impact of inpatient length of stay reduction by discharge status in the hospitals of Syracuse, New York between 2008 and 2018. It focused on differences in stays and related utilization for the two largest services, adult medicine and adult surgery.

This study and the programs it addressed were based on the use of severity of illness data for inpatient lengths of stay in the hospitals. These data enabled the hospital staffs to identify length of stay issues within adult medicine and adult surgery and address them. Without severity of illness data, decreases or increases in stays might have resulted from variations in the characteristics of the inpatient populations, rather than the impact of length of stay reductions.

At the aggregate level, the study demonstrated that stays declined for both
services during the ten year period. The adult medicine mean length of stay declined by 0.12 days, resulting in a savings of 14,154 patient days. At a late stay expense of $600 per patient day, this would amount to approximately $8,500,000 in annual expenses. The adult surgery mean length of stay declined by 0.91 days, resulting in a savings of 22,639 patient days. At the same rate, this would amount to $13,500,000 in annual expenses.

The reductions in stays were accompanied by different changes in utilization by discharge status. For discharges to self care, the changes in mean stays were 0.06 days for adult medicine and 0.48 days for adult surgery. For this discharge status, discharge volumes were large, resulting 12,000 - 13,000 annual days saved per year. These reductions were achieved through efficiencies within hospitals. They were supported by hospital control over their own organizations.

For discharges to nursing homes, there were limited increases in actual mean stays that were offset by increased severity of illness. Length of stay reduction for this discharge status was more challenging because of the need to work with long term care providers in the community. For this discharge status, excess days remained at the end of the ten year period.

The study excluded discharges to home health care, deaths, and inter hospital transfers because they were not addressed by specific programs in the hospitals. At the end of the period, mean stays for adult surgery patients discharged to home care, as well as deaths and transfers for both services were shorter than severity adjusted national averages.

The study demonstrated the uses of data related to hospital discharge status in the planning and implementation of length of stay reduction at the community level. Further research can help identify additional uses of this information.

**Conflicts of Interest**

The authors declare no conflicts of interest regarding the publication of this paper.

**References**


Clinical, Therapeutic and Evolutive Aspects of Patients with Hemophilia in the Surgical Resuscitation Care Unit of Joseph Ravoahangy Andrianavalona JRA Hospital Antananarivo

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Abstract

Background: Hemophilia, a constitutional bleeding disease, has always been present in Madagascar considering children who died after bleeding circumcision, as reported in the family history of the diagnosed patients. Hemophilia is serious because of the potentially fatal risk of hemorrhage. The aim of this study was to evaluate the clinical, outcome and therapeutic aspects of inpatients with hemophilia in the Surgical Resuscitation Unit of JRA Hospital in Antananarivo. Methodology: A descriptive and observational study was led about patients with hemophilia cared in the Surgical Resuscitation Unit from January 2011 to March 2018, studying age, type and severity of hemophilia, reason and duration of hospitalization, treatment instituted and outcome of patients. Results and comments: Thirty-six hemophiliacs (0.2%) were enrolled. The mean age was 9.52 years old; 52.78% were with hemophilia B and 47.22% with hemophilia A, mainly severe. Clinical manifestations were muscle hematomas (25.71%), gum bleeding (14%), epistaxis (14.28%), gastrointestinal bleeding (11.42%), intracranial hemorrhage (11.42%), post circumcision bleeding (11.42%), hematuria, intraperitoneal hematomas and hemarthrosis. Treatment was based on factor concentrate substitution when available. The length of stay ranged from one to thirty days. The evolution was favorable except for two deaths related to delayed management of intracranial hemorrhage. Three patients with hemophilia A developed inhibitors. The results showed that throughout these years of study, a change in management was noted alongside. Conclusion: Hemophilia cases requiring hospitalization were managed in surgical resuscitation unit. The evolution was
mainly related to the availability of clotting factor concentrates in coagulation factors, the delay in taking care of the patients and the presence of specialized staff.

**Keywords**

Hemophilia, Bleeding, Hematoma, Factor Concentrate, Inhibitor

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**1. Introduction**

Blood has always been linked to life; one cannot live without blood. Blood losses are not only provoked; there are those related to blood abnormalities. Hemophilia is one of them, a constitutional hemorrhagic disease, serious due to risk of fatal hemorrhage, genetically transmitted in a recessive mode linked to the X chromosome.

This genetic abnormality, resulting in a deficiency of a coagulation factor VIII for hemophilia A or coagulation factor IX for hemophilia B, has not spared Madagascar [1].

It affects without exception all countries in the world, developing or developed countries, but the level of understanding, care and evolution vary from country to country.

Its prevalence is not completely known in Africa for several reasons: rarity of the disease, high cost of its management, insufficient number of specialists in hematology and absence of adequate laboratories for the biological diagnosis of this disease. It is, however, established that hemophilia is a ubiquitous condition with an annual incidence of 1 in 5000 male births and an estimated population prevalence of 1 in 10,000 to 12,000 regardless of race or geographical area [2] [3]. It is the most common serious hemorrhagic disease in the world. The incidence of hemophilia A is 1 per 5000 births of male children while that of hemophilia B is 1 in 30,000 [2].

Hemophilia has always been present in Madagascar if we consider children who died after bleeding circumcision, as reported in the family history of the diagnosed patients, although, the 125 currently registered patients amount to 5% of the estimated number of Malagasy patient with hemophilia (PwH).

Cases of *de novo* hemophilia were found in the absence of similar hemorrhagic situations in the family. These constitute most of Malagasy PwH B, which are curiously higher in frequency compared to the theoretical world data.

The PwH is a person who lives first in a society. Their immediate neighborhoods, which may be their family, playmates or classmates, are primarily confronted with the hemorrhagic accidents that may occur. They may also be surrounded by members of the society of hemophilia. But they will be routed when needed directly to the nearest health center and especially to the responsible for their illness if they are already known.
The objective of this study was to evaluate the clinical, therapeutic approach and outcome of PwH admitted to the Surgical Resuscitation Unit, responsible for caring of PwH requiring hospitalization in Antananarivo Madagascar.

2. Patients and Method

The Surgical Resuscitation Unit is part of the medical framework for treating hemophilia in Antananarivo Madagascar by treating patients with hemophilia requiring hospitalization.

This descriptive and observational study of all patients with hemophilia admitted to the Surgical Resuscitation Department was led from January 2011 to March 2018.

All hemophilia patients requiring hospitalization and admitted to the Surgical Resuscitation Unit during the period of study were included. Those with other types of congenital bleeding disorders were immediately dismissed.

The studied parameters were the age of the patient, the type and the severity of the disease, the reason for hospitalization, the elements of the treatment and the evolution.

The age of the hemophiliac patient at the time of admission to the hospital was recorded in years.

The type of hemophilia A (factor VIII deficiency) or B (factor IX deficiency) as well as the severity can be found, among other things, on the hemophilia card of each patient. This card was given to each hemophilia patient diagnosed from the year 2015. For patients who had not yet had a card at their admission (before 2015) or who had forgotten it, the type and severity of hemophilia were transmitted by the Hemophilia Treatment Center of JRA Hospital which holds the registry of hemophilia in Madagascar.

The characteristics and location of the hemorrhagic syndrome motivated the admission of the patients to the surgical resuscitation unit. They may be patients referred by the Hemophilia Treatment Center or patients admitted directly to the Resuscitation Department.

The duration of hospitalization was counted from the day of admission for the reason of hospitalization to the actual day of discharge.

Treatment was based on substitution therapy, with or without adjuvant therapy. The study considered the use of fresh frozen plasma (FFP) transfusion, the use of other hemostatic drugs, and access to the specific antihemophilic factor concentrate.

The study noted the evolution of the bleeding syndrome after the treatment undertaken as well as the state of the patient during his hospitalization, the favorable course, the presence of complications or the patient’s death.

Data were collected and analyzed in Excel 2013. The averages were calculated with a 95% confidence interval. A value of $p < 0.05$ was considered significant, using the chi-square test.

The study was careful to keep confidential the identity of the patients as well as all the data concerning them.
3. Results and Comments

Of the 14,658 patients hospitalized in the Surgical Resuscitation Unit during the study period, 36 (0.27%) obviously male patients were with hemophilia.

The average age of inpatients was 9.59 years old with extremes of 2 and 43 years old.

The median age was between 4 and 15 years old with the maximum number of patients (n = 17, 47%), 13 patients (36%) were over 15 years old and 6 (17%) were less than 3 years old (Figure 1).

According to the type of hemophilia and the severity of the disease, 19 (52.78%) were patients with hemophilia B and 17 (47.22%) with hemophilia A, the majority of patients had severe hemophilia i.e. with a factor level < 1%, 15 out of 19 hemophilia B and 12 out of 17 hemophilia A. Moderate hemophilia defined as factor level between 1% and 5% accounted for 25% of patients (n = 9). There were no cases of mild or minor hemophilia (factor > 5%) (Figure 2).

The reasons for hospitalization were smooth muscle hematoma for 9 patients (25.71%), gum bleeding and epistaxis respectively for 5 patients (14.28%), gastrointestinal bleeding for 4 patients (11.42%), intracranial hemorrhage for 4 patients (11.42%), 4 patients (11.42%) had bleeding after circumcision, two patients (5.71%) with hematuria, one with hemarthrosis, one with hemoperitoneum and one with obnubilation (Table 1).

Of the hemophilia patients, 31.42% were given replacement therapy with clotting factor concentrate.

Regarding replacement factor, 1048 IU was the average amount of factor VIII for patients with hemophilia A. For those with hemophilia B, the amount of average factor IX injected was 1277 IU. In addition to coagulation factor concentrate, 45.71% of patients received transfusion of FFP. Tranexamic acid was the antifibrinolytic molecule used in patients with hemophilia included in the study, with 10 mg/kg every 8 hours in intravenous route, apart from the patient with hematuria where antifibrinolytic agent was not indicated.

Seeking for inhibitors was specified when persistence of the bleeding syndrome despite the substitutive treatment. Three patients with severe hemophilia A were confirmed having developed inhibitors (8.33%). An 8-year-old patient was admitted for hemarthrosis localized in the right knee. The search for inhibitors in this patient was performed after 3 days of factor replacement therapy in response to a poor clinical response. Another one, 19 years old, was first admitted in 2015 for iliopsoas hematoma and in 2017 for epistaxis. Factor assay in this patient was performed after 6 days of factor replacement therapy with poor clinical response to treatment. The third, a 6-year-old patient, was exposed to replacement therapy due to the management of a traumatic fracture of the forearm. The inhibitor assay was performed at 7 days of factor replacement therapy (Figure 3).

Mean hospital stay was 8.5 days with extremes of 1 and 30 days.

Most patients (n = 27, 74.28%) were discharged directly after a favorable course of the bleeding syndrome.
Table 1. Causes for hospitalization.

<table>
<thead>
<tr>
<th>Causes for hospitalization</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectal bleeding</td>
<td>1</td>
</tr>
<tr>
<td>Lodge syndrome on closed radius fracture</td>
<td>1</td>
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<tr>
<td>Cranial injury with obturation</td>
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</tr>
<tr>
<td>Hematemesis post tonsillectomy</td>
<td>1</td>
</tr>
<tr>
<td>Gastrointestinal bleeding</td>
<td>2</td>
</tr>
<tr>
<td>Gum bleeding</td>
<td>5</td>
</tr>
<tr>
<td>Epistaxis</td>
<td>5</td>
</tr>
<tr>
<td>Epidural hematoma</td>
<td>1</td>
</tr>
<tr>
<td>Subdural hematoma</td>
<td>2</td>
</tr>
<tr>
<td>Hematoma and brainstem compression</td>
<td>1</td>
</tr>
<tr>
<td>Iliopsoas hematoma</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
</tr>
</tbody>
</table>

Figure 1. Age of inpatients with hemophilia.

Figure 2. Type and severity of hemophilia.
Seven patients (20%) were moved to other departments, particularly in the Visceral Surgery one for surgical wound monitoring.

Two patients (5.71%) unfortunately did not survive: two patients with post-traumatic intracranial hemorrhage, who arrived at the hospital only 48 hours later in a coma state.

Regarding the length of hospital stay, patients with hemophilia A had significantly a long duration of stay (10 days) compared to patients with hemophilia B (5 days) with a p-value < 0.0001 (Figure 4).

Patients with hemophilia A required more FFP transfusion (6 bags) compared to those with hemophilia B patients (3 bags) with a p-value < 0.0001 (Figure 5).

Clinical manifestations analysis according to the type of the hemophilia and the age did not allow to note any significant difference on the clinical aspects and on the outcome with a p-value > 0.05 (Table 2).

The number of patients who developed inhibitors was 3 out of 17 patients with hemophilia A whereas none of the 19 hemophilic patients B had developed inhibitors but the difference was not significant (p > 0.05).

However, a significant difference was noted in the amount of FFP transfusion and the length of hospital stay.

The purpose of this study was to describe the clinical, therapeutic and progressive aspects of hemophilia patients who required hospitalization. The Surgical Resuscitation unit of JRA Hospital is in charge of taking care of these patients. Although they represent only a small part of the patients admitted to intensive care, they nevertheless constitute a heavy burden due to seriousness of complications of hemophilia.

The number of patients with hemophilia (PwH) in the surgical resuscitation department was very low compared to the volume of activities of this unit. A study led by Tutus F et al. in 2012 in Brussels found the same result with only 0.05% of patients admitted to emergency departments being with hemophilia [4].
Resuscitation Unit main objective is the management of patients whose vital prognosis is engaged [5]. PwH are included in life-threatening patients with hemorrhagic episodes, particularly for high-risk hemorrhagic sites.

The selection of patients to be admitted into intensive care is based on many criteria such as the severity of the pathology, the state of the patient and the background [6].

PwH may not only have various clinical manifestations related to their bleeding disorder, but also medical or surgical problems other than hemophilia bleeding, which should be managed appropriately [4].

**Table 2.** Comparative analysis of variables according to the type of hemophilia.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Hemophilia A (N = 17)</th>
<th>Hemophilia B (N = 19)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age</td>
<td>15.94 yrs</td>
<td>12.00 yrs</td>
<td>0.2</td>
</tr>
<tr>
<td>Severity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>5</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>12</td>
<td>15</td>
<td>0.87</td>
</tr>
<tr>
<td>Causes for admission</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gastrointestinal bleeding</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Gumbleeding</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Post circumcision bleeding</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Muscle hematoma</td>
<td>6</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Intracranial bleeding</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Hemarthrosis</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Hemoperitoneum</td>
<td>1</td>
<td>0</td>
<td>0.88</td>
</tr>
<tr>
<td>Hematuria</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Epistaxis</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Length of stay</td>
<td>10 days</td>
<td>5 days</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Outcome</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Favorable</td>
<td>15</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Death</td>
<td>1</td>
<td>1</td>
<td>NS</td>
</tr>
</tbody>
</table>

![Figure 4. Length of hospital stay.](https://example.com/figure4.png)
All of these reasons including serious conditions either because of bleeding location, because of their complication, or because of their unpredictable evolution, justify the presence of PwH in intensive care unit.

Moreover, it is interesting to note that the frequency of hemophilia B in Madagascar is much higher than the average described in the literature, especially Diop S et al. in Senegal report an incidence of 90.7% for hemophilia A and 9.2% for hemophilia B [3] and Mason et al. in Australia, 81.2% for hemophilia A and 18.7% for hemophilia B [7].

The most common manifestation found in this study was muscle hematoma with a predominance of localization in the iliopsoas muscle, followed by gum bleeding and epistaxis.

Management of muscle hematoma requires for the most part a surgical treatment [8]. Given the high bleeding risk in PwH and the lack of adequate platform in other units for the management of a possible abundant hemorrhage, the choice of the surgical resuscitation unit was adapted to the situation.

This predominance of muscle localization is also found in other studies as it was described by Fernandez-Palazzi et al. in 1996 [9], Ashrani et al. in 2003. [10] and confirmed by a previous study by Fety in 2016 concerning iliopsoas hematoma in Malagasy PwH [11].

Epistaxis and gum bleeding are certainly not dramatic clinical manifestations, but their evolution is still unpredictable especially in case of severe hemophilia or development of inhibitors [12].

Although osteoarticular complications of hemophilia do not represent a majority among the clinical manifestations in resuscitation unit in this study, they remain nonetheless dangerous. Indeed, they can lead to disabling sequelae seriously affecting the quality of life of PwH [8]. This is why fast and effective care as well as close supervision must be implemented. According to Vanderhave et
T. R. A. Andrianjaifarinoa et al., early hemarthrosis should be managed aggressively with a concentrate of aspiration and coagulation factor until the joint examination is normal [8]. Hemarthrosis is not a reason for hospitalization in intensive care. The only case admitted and found in this study concerned a hemarthrosis greatly invalidated, highly painful and resistant to the treatment occurring in a patient with development of inhibitors, after exposure to a substitutive concentrate factor, explaining the persistence and worsening of clinical manifestations.

Intracranial hemorrhage is in itself a life-threatening condition [13], leading PwH to the surgical resuscitation unit. The Glasgow score is one of the criteria for admission to the Surgical Resuscitation Department for neurosurgery. This score is the reference for assessing the coma depth of a patient over the age of 5, supplemented by the Liege score, which evaluates reflexes of the brainstem [14].

Patients with a Glasgow score of 8 or less are admitted to the Surgical Resuscitation Unit. Some exceptions, however, are noteworthy depending on the patient’s state and context. Hemophilia is one of them because of the sometimes rapid and unpredictable evolution of neurological signs. The case of a PwH B hospitalized in the Department of Surgical Resuscitation was the subject of a study in 2012 to illustrate this situation: he started from a Glasgow score of 12 to evolve in a few hours to a very huge extra-dural hematoma [15].

Hemoperitoneum also motivated admission of PwH in this study. According to Jones JJ, it is a major mortality factor in PwH [16]. This necessarily requires hospitalization in a surgical resuscitation unit, not only because of its severity but also the very likely possibility of surgical evacuation.

PwH with gastrointestinal bleeding (11.4%), such as melena, hematemesis or rectal bleeding, were admitted to the Surgical Resuscitation Unit. Gastrointestinal bleeding can unpredictably progress, potentially leading to a life-threatening situation [17].

During this study, it was noted that gastrointestinal bleeding was a common reason for hospitalization in the Resuscitation Unit for non-hemophilic patients. The literature indicates that PwH exercise it 5 to 10 times more frequently than a non-haemophilic population not exposed to non-steroidal anti-inflammatory drugs [18].

Three patients were hospitalized for post circumcision bleeding. Circumcision is part of the culture in Madagascar. Its practice exposes patients with hemophilia to a high risk of perioperative and postoperative bleeding, especially in developing countries where the disease is still poorly understood by the population and where financial means are limited [19]. Many Malagasy PwH have a family history of post-circumcisional deaths, due to an abundant post operate bleeding, during a traditional way for most of the time. It is only after one or more deaths that investigations are started to establish a diagnosis for the others members of the family. Worldwide, the incidence of bleeding complications in some countries during circumcision is still significantly elevated in known hemophiliacs. For example, Nigeria has a frequency of 52% [20], and for Morocco a frequency
of 41% [19]. In Turkey, however, one study found a frequency of 6%, due to the use of fibrin glue in this country when practicing circumcision of hemophiliac patients [21].

Concerning inhibitors, it was reported that about 20% to 30% of severe hemophiliacs develop an anti-FVIII antibody as a result of treatment. On the other hand, the risk is lower for PwH B [17]. In this study, all of the patients who developed inhibitors were PwHA severe, no PwH B was found during this study coinciding with the literature [22].

Some PwH were not included because their records were lost. This is essentially the limit to this study.

The results showed that throughout these years of study, a change in management was noted alongside. The awareness of this disease has been enhanced and the availability of clotting factor concentrates effective since 2016 thanks to WFH Humanitarian Aid program.

4. Conclusions

The knowledge of hemophilia by healthcare professionals in Madagascar has significantly improved the conditions of care of patients with hemophilia. The results observed in this study show a good evolution of this care; advances have been noted but much remains to be done.

The evolution was mainly related to the availability of concentrates in coagulation factors, the time taken to treat patients and the existence of specialized healthcare professional dedicated to patients with hemophilia.

The development of inhibitors, however, hampers the management of hemophilia, a topic of current research in the hemophilia scientific community.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Fungal Carbuncle Due to *Apophysomyces elegans*—A Case Report

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**Abstract**

**Background:** Deep seated cutaneous fungal infection is a rare entity in surgical practice and is very often under diagnosed. Due to the atypical presentation and slow but aggressive progression of the disease, the associated mortality is high.

**Aim:** The aim of this article to update clinicians about the peculiar presentation of mucormycosis caused by *Apophysomyces elegans*. **Case Presentation:** A 50 year old gentleman with a painful swelling and fever was admitted into our care. He had history of trivial trauma and no medical comorbid. His initial labs came back relatively unremarkable. He did not respond to an empirical antibacterial regimen and progressively worsened. The region was debrided and found to have granular secretions with sloughed tissue. On opening the dressing post operatively, a fungal mould was found. Fungal etiology was suspected and KOH mount confirmed the diagnosis. He was started on empirical IV antifungals, and local therapy while awaiting culture and sensitivity reports. However, he progressively deteriorated and succumbed to the disease eventually.

**Conclusion:** Here we describe a deep seated cutaneous fungal infection in an immunocompetent patient and the challenges we faced during the course of his management. Fungal etiology is generally encountered in immunocompromised hosts. Deep seated cutaneous fungal infections with poor response to antifungal therapy and systemic sepsis led to this patients’ demise. This being the case, the onus is on the clinicians to diagnose a fungal etiology early and start appropriate anti fungal measures.

**Keywords**

Mucormycosis, Deep Seated Cutaneous Fungal Infections, *Apophysomyces elegans*

**1. Introduction**

Deep seated cutaneous infections are a relatively rare entity in surgical practice, with varied ethology and significant morbidity. Mucormycosis, previously known
as Zygomyces has been found to have significantly worse prognosis as compared to their bacterial counterparts. Multiple organisms are implicated to cause Mucormycosis such as, but not limited to, *Rhizopus spp.*, *Mucor spp.* and *Apophysomyces spp.* Their presentations are atypical, require longer duration to arrive at a clinching diagnosis, require prolonged intensive care and have worse manifestations of sepsis with high mortality. Here, we describe an atypical case of a soft tissue infection of the back, wherein the patient was immunocompetent with a very trivial injury. He was diagnosed with a fungal etiology and was debrided extensively. Here we discuss his presentation, challenges in diagnosis and therapy and the associated mortality.

2. Case Presentation

A 50 year old gentleman, a daily wage worker who carries gunny sacks for a living, from Thiruvallur district in Tamil Nadu, presented to us with pain and swelling over the upper back for a period of 10 days. He gave a history of fever for 2 - 3 days and a preceding history of trauma (a thorn prick) about 10 days back, over the affected region, prior to onset of the complaints. He had no known medical comorbid conditions.

At admission, he was febrile but haemodynamically stable. Systemic examination was unremarkable. Local examination of the back showed a 12 × 8 cm region of induration over the interscapular region of the upper back, with minimal fluctuation in the centre, with a discharging sinus (greenish serous fluid). Local warmth and tenderness was present.

He was admitted to our ward with a working diagnosis of cellulitis of the back and routine investigations along with a culture of the fluid. He was started on IV Cefotaxim and IV Metronidazole. His labs showed a raised total count (19,900/mm³) and neutrophils. He was found to have high random sugars (206 mg/dl), with normal HbA1c (5.9). Ultrasonogram showed soft tissue oedema with no collection (Figure 1). Aerobic and anaerobic cultures were found to have no growth.

After 3 days of bed rest, regular local care and IV antibiotics, he still had fever spikes, with increasing total leucocyte counts (26,000/mm³). IV Antibiotics were stepped up to Cefaperazone + Sulfbactem. Locally a central necrotic patch with multiple discharging sinuses, resembling a carbuncle was found on day 3. He was taken up for emergency deroofing of the carbuncle (Figure 2).

Intraoperatively, a cruciate incision was placed and deepened. White to straw coloured flakes was found deep in the subcutaneous, up to the muscular plane, with minimal granular fluid exuding. Devitalised necrotic tissue was excised. Tissue was sent for culture and histopathology. Debridement was done. Postoperatively his total leucocyte counts continued to increase (39,000/mm³). On POD1, his dressing was opened to find severely necrosed tissue, with extensive areas of necrotising fasciitis, granular discharge and a mould formation around the edges (Figure 3). He was taken up for debridement again. The mould was removed and necrosed tissue was excised aggressively until active bleeding was
noted from all quadrants of the wound and fungal culture was sent. Post operatively patient developed hypotension and required ICU care. A significant drop in haemoglobin was noted, for which transfusion of packed cells was given. Total counts dropped marginally (38,000) but was not significant. A bit of tissue taken from the wound was examined with a KOH mount. Multiple branching hyphae were noted (Figure 4). A working diagnosis of a fungal aetiology was reached. Empirical IV antifungals (Amphotericin B) were started and local care was initiated with an experimental application of candid powder on one half of the wound and fluconazole ointment on the other side. After 3 days of regular daily dressings, the side which was applied with the ointment showed considerable improvement as compared to the side with the powder (Figure 5). During the course of these days, fresh frozen plasma and packed cells were transfused.

**Figure 1.** Image depicting the ultrasonogram of the back on presentation to the hospital. It showed subcutaneous edema, with no evidence of a collection.

**Figure 2.** Intra operative picture during the first debridement, showing extensive invasion with sloughed tissues upto the muscular plane.
Figure 3. Image taken on first post operative day showing extensive necrosis with a fungal mould formation at the edges of the wound.

Figure 4. KOH Mount of tissue taken during first debridement showing multiple branching hyphae with separations.

Figure 5. Image depicting wound after 3 days of experimental local therapy with candid cream and fluconazole ointment. The side that was dressed with fluconazole ointment showed considerable local control as opposed to side with candid cream.
However, Patients general condition rapidly deteriorated and he died on the 14th post operative day.

The fungal culture sent was later found to have slow growing cottony colonies which was further inoculated in potato dextrose agar and was found to grow *Apophysomyces elegans*.

The patients’ relatives present were informed regarding the rarity of the case and their informed consent was obtained to publish his case in a journal.

### 3. Discussion

Cellulitis is often caused by gram positive cocci. Anaerobes are another cause for more severe and aggressive forms of cellulitis. Approximately 50% of such infections are polymicrobial; the remainder is caused by single organisms. Fungal aetiology in cellulitis is as such very rarely seen.

Fungi of relevance in cellulitis include those that cause nosocomial infections in surgical patients as part of polymicrobial infections or fungemia (e.g. *Candida albicans* and related species), rare causes of aggressive soft tissue infections (e.g. *Mucor, Rhizopus, and Absidia spp.*), and opportunistic pathogens that cause infection in the immunocompromised host (e.g. *Aspergillus fumigatus, niger, terreus*, and other spp., *Blastomyces dermatitidis, Coccidioides immitis*, and *Cryptococcus neoformans*).

Fungal infections may be superficial, cutaneous, subcutaneous or deep (systemic). Superficial and cutaneous infections usually involve the hair, nail and superficial skin layers. They are caused mainly by the *Candida spp.* of fungi. Subcutaneous or deep seated infections are more severe and have a worse course. *Chromoblastomycosis, Mycetoma and Sporotrichosis* are among the most common.

*Mucormycosis* (previously called zygomycosis) is a serious but rare fungal infection caused by a group of moulds called *Mucormycetes*. Fungi that most commonly cause mucormycosis are: *Rhizopus species, Mucor species, Cunninghamella bertholletiae, Apophysomyces species*, and *Lichtheimia* (formerly *Absidia*) species [1]. Mucormycosis can affect nearly any part of the body, but it most commonly affects the sinuses or the lungs in people who have weakened immune systems. The common forms are Rhino cerebral, Pulmonary, Cutaneous, Gastrointestinal and Disseminated [1]. Cutaneous (skin) mucormycosis can look like blisters or ulcers, and the infected area may turn black. Other symptoms include pain, warmth, excessive redness, or swelling around a wound [2]. Mucormycosis is rare, but it’s more common among people with weakened immune systems such as diabetes, especially with diabetic ketoacidosis, cancer, organ transplant, stem cell transplant, neutropenia, long-term corticosteroid use, skin trauma (due to surgery, burns, or other skin injuries). Treatment with IV antifungals is the mainstay of therapy, with Amphotericin B, posaconazole, itraconazole or isavuconazole being the first line drugs. Hyperbaric Oxygen Therapy [3] showed promise in treatment of cutaneous mucormycosis post debridement.
The overall prognosis depends on several factors, including the rapidity of diagnosis and treatment, the site of infection, and the patient’s underlying conditions and degree of immunosuppression. The overall mortality rate is approximately 50% [1], although early identification and treatment can lead to better outcomes.

Fungi typically are identified by use of special stains (e.g. potassium hydroxide (KOH), India ink, methenamine silver, or Giemsa). Initial identification is assisted by observation of the form of branching and septation in stained specimens or in culture. Final identification is based on growth characteristics in special media, similar to bacteria, as well as on the capacity for growth at a different temperature (25°C vs. 37°C), which takes around 2 weeks. No sporulation has been noted on slide cultures even after 7 days of incubation on SDA, corn meal dextrose agar, or potato dextrose agar. Stimulation of sporulation has been attempted by the method of Ellis and Ajello [2]. Abundant sporulation has been noted after 5 days on 1% water agar by this procedure [4]. The use of Soil extract media to enhance sporulation of *A. elegans* was attempted. The growth of *A. elegans* in this media was observed much earlier as compared to other methods [5]. However this method has been only documented once in literature and requires further study.

*Apophysomyces elegans* [6] is a filamentous fungi that is found in soil and decaying vegetables. It’s a thermotolerant fungus that grows at temperatures of 26°C and 37°C. It goes rapidly at 42°C. It produces cottony colonies. It is a rare cause for mucormycosis, which is often fatal. It is usually acquired via traumatic implantations associated with still or decaying vegetables matter. Unlike other zygomycosis, affected host is usually immunocompetent. *A. elegans* infections present most commonly as necrotising fasciitis, osteomyelitis, systemic infections and secondary renal or bladder infections.

Kindo A J et al. have described a case of left sided orbital cellulitis secondary, wherein the patient inspite of aggressive debridement and treatment with amphotericin B succumbed after 3 weeks [7]. Andresen D et al. have reported a post tsunami survivor who developed cutaneous mucormycosis and succumbed to the disease with multi organ failure and muscle and fat necrosis [8]. Wolkow N et al. have described a case of chronic rhino orbito cerebral mucormycosis due to *A. elegans*, who underwent multiple courses of antifungal therapy (primarily posaconazole) over a year and survived after a slow intermittent course [9]. Chakrabarti A et al. have published a series of 75 cases of Zygomycosis wherein 19% of cases were caused by *A. elegans*. Overall mortality of 45% was noted in their study [10].

Mucormycosis is treated with IV antifungal agents, mainly Amphotericin B, Isavuconazole, Posaconazole. Early initiation of antifungals is essential in enhancing the survival of patients. Amphotericin B is most commonly initiated, with a loading dose of 0.25 - 0.5 mg/kg over 2 - 6 hours followed by maintenance dose of 0.25 - 1 mg/kg qDay or upto 1.5 mg/kg qOD. It is highly nephrotoxic, and creatinine clearance must be calculated prior to administration. If CrCl < 10 mL/min, 05 - 0.7 mg/kg q24 - 48 hr is given. Patient may require haemodialy-
sis, in which cases, 0.5 - 1 mg/kg q24 hr after dialysis session may be given. Recently, resistance to Amphotericin B has been noted [11]. In these patients Posaconazole has been shown effective. It is given as 300 mg IV twice on day 1 and followed by 300 mg IV daily. IV administration can be changed to oral (300 mg BD on day 1 followed by 300 mg daily) if eGFR < 50 ml/min in patients with moderate to severe renal impairment. Posaconazole, Itraconazole have been shown to be most active against A. elegans [12]. Liposomal Amphotericin B can be used to minimize nephrotoxicity. Caspofungin, is an echinocandin, used in antifungal therapy. Its role in mucormycosis has not been specifically documented, but has been used in treatment of aspergillosis and candidiasis. Other azoles such as fluconazole, voriconazole are ineffective against Mucorales species.

In this particular case, the patient presented to us with a trivial trauma to the back and cellulitis. He was an immunocompetent patient with no known comorbid illnesses. He did not respond to empirical antibiotics and the subsequently added higher generation antibiotics. On debridement granular exudate was noted which gave rise to the suspicion of a fungal aetiology. However, it was the presence of a fungal mould that confirmed our suspicions. The diagnosis was confirmed by KOH mount and empirical antifungals were started. Fungal cultures were sent. Experimental local therapy with fluconazole ointment and candid powder was initiated. The side which was dressed with fluconazole showed considerably better granulation tissue. The wound bled severely during debridements and dressing changes and this proved to be a challenge. He required repeated transfusions and prolonged ICU care. The fungal culture required long incubation periods and were not available until the patients eventual demise.

4. Conclusion

Apophysomyces elegans affects immunocompetent hosts and causes severe morbidity and mortality. Hence high degree of suspicion is required to identify deep seated fungal infections and initiate appropriate management at the earliest.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References


Ectopic Pregnancy Combined with Intra-Uterine Pregnancy with a Full-Term Live Baby: A Case Report and Review of Literature

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Abstract

Heterotopic pregnancy is no more a medical breakthrough. It combines intra-uterine pregnancy and extra-uterine pregnancy regardless of location. We report a case of intra-uterine pregnancy associated with a ruptured abdominal ectopic pregnancy located on the pelvic colon in a 29-year-old patient, third gestation, primigravida, having a live baby and a prior history of two abortions. She has blood group O negative of Rhesus. It has been diagnosed at the stage of the rupture of ectopic pregnancy. An emergency laparotomy performed under blood transfusion has revealed heavy hemoperitoneum (1100 ml), a ruptured abdominal extra-uterine localized on the pelvic under blood transfusion and a bulging uterus. We have proceeded with the aspiration of hemoperitoneum, the ablation of the extra-uterine pregnancy and the hemostasis of the section part. The post-operative follow-up has been easy. The intra-uterine pregnancy has developed normally and has given birth to a full-term live, and healthy baby.

Keywords

Heterotopic Pregnancy, Diagnosis, Maternal and Fetus Prognostic

1. Introduction

The coexistence of an intra-uterine pregnancy (IUP) and extra-uterine preg-
nancy (EUP) in the same patient is a combined pregnancy (CP) also known as heterotopic or ditopian pregnancy [1]. In the past, heterotopic pregnancy was rare but now it is getting more and more observed in hospital practices since the promotion of medically Assisted Reproductive Techniques (ART) on one hand and on the other hand the increase of pelvic infections [2] [3] [4]. Its frequency is differently appreciated by authors. It varies from 1/30,000 spontaneous pregnancies to 1/100 stimulated pregnancies. It was first described by DUVERNET in 1708 during an autopsy [4]. It is a growing health concern due to its emergency feature and aftereffect. Every heterotopic pregnancy presents live threatening conditions of three individuals (the mother and the two embryos/fetus); hence there is urgent need for adequate measures. In maternal health centers, it presents diagnostic and therapeutic difficulties despite the widespread of ultrasound scan and the promotion of emergency services. Its prognostic is highly related to the diagnostic precocity and the efficiency of the treatment. We report the first case of diagnosed heterotopic pregnancy at the stage of rupture of ectopic pregnancy in gynecology and obstetrics department of the Referral health center of Kati.

2. Observation

Madam D.K, 29-year-old, third gestation, primigravida, having a live baby and a prior history of two abortions has been referred to the emergency service of the maternity hospital of the Referral health center of Kati in February 18th, 2017 for paleness and faintness attacks. It was a patient who had been admitted in a private clinic of the city of Kati for severe pelvic pain that has been increasing over 48 hours with delay of menses of more than a month. A urinary pregnancy examination (Beta HCG test) she had undergone was positive and an ultrasound scan performed in emergency had revealed an ongoing singleton intra-uterine pregnancy estimated to six weeks and five days (6W + 5D).

A blood test was run at the same clinic and she was group O negative Rhesus and the hemoglobin level was 11 g/dl.

The diagnosis of the doctor of the clinic was the threatening condition of spontaneous abortion, particularly when referring to the prior history of two spontaneous abortions.

Mrs DK has received the following treatment: analgesic and antispasmodic rest resulting in the development of symptoms in first 48 hours, then sudden alteration of her state with the occurring of paleness and faintness attacks. So, she was transported to the Referral health center of Kati.

On admission, her overall vitals were altered with a Glasgow score of 3 over 15, a conjunctival pallor and constant hemodynamic in stability (BP = 90/60 mmhg, P/R = 105/min, heart rate to 27 beats/min). On per abdomen examination, we noted the presence of irritation indications and peritoneal fluid (the cry of the umbilicus and the fluid wave were present). The vaginal or rectal touch has revealed a big uterus with a closed, long, soft and posterior neck, without bleeding.
and increased pain on the left lower quadrant (the presence of the cry of Douglas).

We have immediately performed a median abdominal ultrasound that has shown an intra-uterine pregnancy associated with large amount of hemoperitoneum.

The laboratory pre-operative examination has found out a blood group O negative and hemoglobin rate at 5.8 g/dl.

We have immediately done a median laparotomy (Figure 1) performed on blood transfusion. The endoscopic surgery has presented:

- Heavier hemoperitoneum of 1100 ml;
- A ruptured abdominal extra-uterine located on pelvic colon and a bulging uterus.

We have proceeded with:

- Aspiration of hemoperitoneum;
- Ablation of EUP;
- Hemostasis of the section slice;
- Abdominal wall closure plan by plan.

In the post-operative phase, the therapeutic protocols given to the patient were:

- Continuous perfusion of 6 ampoules of phloroglucinol trimethylphloroglucinol in Ringer-Lactate solution for injection during 48 hours;
- Intra-muscular injection of Delay-Progesterone;
- Administration of Anti-D blood grouping serum;
- Administration of antibiotics for 7 days.

The patient has received in overall four units of total blood group Rhesus.

The post-operative recoveries were simple. The patient was discharged from the hospital at D10 of post-operation.

The histology examination confirms the colic seat of EUP with the discovery of fetus structures and colic appendixes in the operation bloc (Figure 2).

Figure 1. Prior operative image.
The intra-uterine pregnancy has been monitored by the obstetrician gynecologist of the Referral health center of Kati. It has progressed normally and the lady has vaginally given birth to a healthy baby at 39 W 2 days. The baby was blood group O positive Rhesus, the Anti-D blood grouping serum was administered to the mother in the 24 hours of delivery. The postpartum recoveries were simple.

3. Discussion

The heterotopic or combined pregnancy is a pathological association of EUP and IUP in the same patient. It is bi-ovular twin pregnancy in which the nidation of the embryo has occurred in two different areas, one of the two being in uterine cavity [1]. This particular form of twinning is rarely observed on spontaneous pregnancy. Therefore, in a year of activity, we reported one case of spontaneous heterotopic pregnancy out of 2247 deliveries in 2017 and 26 cases of EUP. The frequency noticed in our service is in accordance with that reported in a review of literature where authors [5] [6] indicate the rarity of the pathology. However, nowadays this frequency is increasing pertaining to the rise in medically Assisted Reproductive Technology and the growing of pelvic inflammatory disease (PID) that are the consequences of treated and non-treated Sexually Transmitted Infections (STIs) and repetitive abortions. This is likely the case in our observation because the only probable risk noticed in the patient is the history of prior repetitive abortion. Other authors [7] [8] have similar cases.

The diagnosis of heterotopic pregnancy is difficult when the threatening conditions of miscarriage and miscarriage come in forefront. This often leads to misdiagnosis faced with the existence of IUP. That is the cause of the diagnostic delay and the management of EUP which is only noticed in a great number of cases at the stage of rupture with maternal and fetus lives threatening (IUP). The authors [9] agreed that it is necessary to think of ectopic pregnancy when deal-
ing with IUP in the first trimester associated with latero-uterine mass with or without peritoneal signs. In our case, it is peritoneal sign that was predominant. Nevertheless, this diagnosis is easy with ultrasound scan that highlights signs of complication of EUP (peritoneal fluid), of the two pregnancies or of the IUP associated with latero-uterine mass. The endoscopic surgery is the reference that permits to confirm the diagnosis and the treatment at the same time.

In our structure where this means of diagnosis is not available, we have used the information from the clinic features of chock (chock board) and the hemo-peritoneum discovered at the emergency ultrasound to perform laparotomy. The endoscopic surgery is mainly practiced widely in well-equipped hospitals [10]. The medical treatment is possible by using methotrexate if IUP is not progressing, in contrast this product will be substituted to the potassium chloride for local injection. The fetal prognostic of IUG is better if the diagnosis is early and the morbid condition is absence. Thus, as it is the case in our observation, great number of live fetus (IUP) after treatment of EUP have been listed in the literature [10].

4. Conclusion

The diagnosis of heterotopic pregnancy must be always reflected on when dealing with a persistent pelvic pain at routine treatments despite the existence of intra-uterine pregnancy. The intra-uterine pregnancy would become more favorable with the increasing of early diagnosis and required treatment.

Authorization of the Ethics Committee

We, undersigned, authors of this article, give evidence to have received the authorization of the Ethics Committee of the Faculty of Medicine of Bamako.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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