

Early reoperation in pediatric surgery at the Teaching Hospital Gabriel Touré

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Abstract

Introduction: To identify complications requiring early reoperation and to determine associated risk factors in the pediatric surgery of the teaching hospital Gabriel Toure.

Materials and Methods: A retrospective study of children 0-15 years old during 4 years (January 2014 to December 2017) presenting with a post-operative complication requiring a reoperation and taken care of during the period of study. Observation of bowels or the liquid stools through the opened wound, the presence of air-fluid levels on an abdominal plain X-ray and the absence of resumption of intestinal transit allowed us to make a decision to re-operate.

Results: We have re-intervened on 103 patients because of early post-operative complication out of 4730 cases of pediatric surgery carried out in this hospital during these 4 years. This represented 1.54 % of our total surgical activities. The average age of our patients was a 5.2±2.3 year ranging from 2 months to 15 years. The sex ratio was 0.94. Eighty four (81.55 %) of our patients were admitted and operated on emergently. Peritonitis due to digestive system perforation represented 45.28 % of the indications for reoperation followed by the acute intestinal intussusceptions (10.7 %) and traumatic eviscerations (9.7 %). The average duration before the first intervention was 80±13.6mn. The post-operative evisceration was the 1st cause of reoperation followed by the post-operative peritonitis and then post-operative intestinal obstruction. The average time to reoperation was 6.9 ± 4.2 days.

Conclusion: In our hospital risk of reoperation has an association with: indication of first surgery, operating technique, experience of the surgeon, malnutrition and anemia ($p < 0.05$). On the other hand sex, age and the duration of surgery have no effect on early reoperation ($p > 0.05$).

Keywords

- Early
- Reintervention
- Risk factors
- Child
- Mali
- Bamako

Introduction

Surgical reoperation is the second intervention which is made in order to treat complications that occur following the first intervention.¹ Post-operative complications constitute problems which compromise the success of a surgery. In spite of the use of modern techniques and competent talented surgeons, post-operative complications requiring a reoperation can still arise. The morbidity and the mortality of these reoperations remain high. The rarity of studies addressing this problem in the African literature especially in the field of pediatric surgery motivated us to conduct this research in our pediatric surgical service of the Gabriel Toure teaching hospital.

Materials and Methods

In this descriptive retrospective study-during a 4 year period from January 2014 to December 2017-103 children 0-15 years old presenting with a post-operative complication requiring a reoperation were evaluated. Observation of bowels or the liquid stools through the opened wound, the presence of air-fluid levels on an abdominal plain X-ray and the absence of resumption of intestinal transit were indications to re-operate.

Results

In 4 years, 4730 surgical operations were done,

out of which 103 cases needed reoperation. This represented 2.17 % of our surgical patients. The sample included 2048 boys and 2682 girls. The sex ratio was 0.94. The rate of reoperation was 2.44 % for the boys and 1.97 % for the girls. The sex was not a factor of re-intervention (p: 0.3242). The average age of the patients in need of reoperation was of 5.2 ± 2.3 years ranging from 2 days to 15 years and 4.8 ± 3.5 years for those whom did not need a reoperation. The nurslings were the most common age range represented in our series. The age was not a factor of re-intervention (p: 0.1895). During the period of study 2023 patients (42.77 %) were admitted through the emergency department and of these 84 (4.15 %) underwent reoperation. This was 0.70 % of the patients operated on under scheduled conditions. The mode of recruitment influenced the reoperation (p: 0.0000).

Among 1577 patients operated by training surgeons, 76(4.81 %) needed reoperation due to complications versus 0.85 % of cases that were managed by attending pediatric surgeons. The experience of the surgeon negatively influenced the need for re-intervention (p: 0.0000).

Acute peritonitis dominated the indications for the first intervention. The diagnoses and the rates of re-interventions are listed in the **Table 1**.

Table 1: Diagnosis of the first intervention and re-intervention rate

| Indications | N | % |
|----------------------------------|------|------|
| Traumatic evisceration | 217 | 0,46 |
| Peritonitis | 1201 | 3,99 |
| Acute intestinal intussusception | 862 | 1,27 |
| Exomphalos | 58 | 8,62 |
| Appendicular Abcess | 526 | 1,33 |
| Strangulated hernia | 656 | 0,30 |
| Esophageal and ileal atresias | 85 | 8,23 |
| Hirschsprung disease | 778 | 1,15 |
| Gastrochisis | 20 | 20 |
| Others | 327 | 0 |

Average length of first operation was 80 ± 13.6 min ranging from 30min to 90 min versus 77 ± 8.9 min in patients which did not experience complications in need of surgery. Duration of the first operation was not a determining factor for appearance of complications necessitating reoperation ($p: 0.9987$).

Malnutrition was noted in 57 (55.33%) cases and anemia in 33 (32.03%) cases of re-operated patients. Reoperation rate in well-nourished patients was 1.06% and 1.86% in patients without anemia. These 2 tares were risk factors of re-intervention (respectively $p: 0.0000$ and 0.0053). The risk factors of re-intervention are summarized in the **Table 2**.

Table 2: Risk factors of re-intervention

| Riskfactors | N | Re-intervention rate | p |
|------------------------------|------|----------------------|---------------|
| Sex | | | 0.3242 |
| Male | 2048 | 2.44 | |
| Female | 2682 | 1.97 | |
| Age | | | 0.1895 |
| New borns | 633 | 1.42 | |
| Nurslings | 1237 | 2.66 | |
| Small children | 2041 | 1.91 | |
| Older children | 819 | 2.68 | |
| Intervention duration | | | 0.9987 |
| Less than 1h30mn | 1653 | 2.17 | |
| More than 1h30mn | 3077 | 2,17 | |

| | | | |
|------------------------------------|------|-------|---------------|
| Mode of hospital admittance | | | |
| Emergency | 2023 | 4.15 | 0.0000 |
| Scheduled surgery | 2707 | 70 .0 | |
| Surgeon | | | |
| Training | 1577 | 4.81 | 0.0000 |
| Senior | 3153 | 0.85 | |
| Under nutrition | | | |
| Yes | 407 | 14 | 0.0000 |
| No | 4323 | 1.06 | |
| Anemia | | | |
| Yes | 973 | 3.52 | 0.0053 |
| No | 3757 | 1.86 | |

Reoperation was indicated in 49 (47.58 %) cases of post-operative evisceration, 32 (31.07 %) cases of GI fistula and 22 (21.35 %) cases of post-operative obstruction. The average time to reoperation was 6.9 ± 4.2 days with a range of 5 and 11 days. The outcomes of the re-intervention were in 90 cases (87.37 %). We recorded 13 cases (12.6 %) of death after the reoperation. The average duration of hospitalization was of 23 ± 9.5 days with extremes of 10 and 30 days.

Discussion

Frequency of the reoperation varies in different studies. Their incidence varies from 1 to 4.4 %.² Our frequency of 2.17 % is comparable to the 4.4 % of Robert³ in England ($p > 0.05$) and to the 1.23 % of Ellozy⁴ in U.S.A ($p > 0.05$).

Post-operative complications requiring a surgical re-intervention can arise at any age. The infants were the most represented in our series. This could be related to the nature of the pathologies at this

age. The age was not a risk factor of re-intervention ($p > 0.05$) in our series contrary to the study by Cigdem et al.⁷

We registered as many girls as boys contrary to Turkish authors^{8,9} who noted a male predominance. This could be due to recruitment bias. The sex was also not a risk factor of re-intervention ($p > 0.05$).

The emergency pathologic conditions do not allow a sufficient correction of anemia and malnutrition before the intervention. These emergency conditions represented 81.55 % of our cases and were recognized as risk factor of re-intervention along with anemia and malnutrition. These defects alter the quality of the tissue and delay the healing.

The post-operative complications requiring re-intervention are multiple and varied. Evisceration represented the 1st cause of re-intervention in our series with 47.58 %. This rate is superior to that of Krivitskii¹⁰ which found 7.23 % ($p \leq 0.05$). Several factors result in an increase of post-

operative evisceration (quality of the suture thread, the experience of the surgeon and infection). Post-operative obstruction is a frequent cause of early re-intervention. The most common cause of postoperative obstructions is adhesion. Early ileus after abdominal operations occurs in 0.86% of cases⁶ The early post-operative occlusion was noted in 21.35 % of our patients. This rate is comparable with that of Krivitskii⁸ ($p > 0.05$) but superior to the study by Haluck⁶ 4.93 % ($p < 0, 05$).

The clinical signs usually considered for the diagnosis of peritonitis lose their value in the post-operative context. Changes in body temperature, the basic element of any post-operative surveillance, are frequently reported as an early sign of complications; but they can be absent and are unfortunately deprived by any specificity. Sometimes the diagnosis is apparent in the face of a digestive or bilious flow from a scar or a route of drainage. The biological markers are also of little contributory, because of their low specificity and often perturbed by the initial surgery.

The abdominal ct scan is the only examination today which can claim to have a place in the diagnosis of the postoperative peritonitis even if the elements which it may show in the first post-operative days are not easy to interpret. A “normal” reported abdominal CT scan should never eliminate the diagnosis of postoperative peritonitis which is clinically made⁷ Besides a contribution to the diagnosis of postoperative peritonitis, it can also help to look for the etiologies or to eliminate a differential diagnosis which would not need re-intervention.

The optimum time for re-operation depends on

the complication and on the decision to operate which is not always easy to set. However once the indication for re-operating is made, the sooner the operation is done the better the outcomes. This interval was on average of 6.9 days in our series, comparable to those reported by the Turkish and Dutch series^{6,10} but superior to the study by Robert et al⁷

The success of the second intervention depends on several elements: the nature of the first operation, the interval between the first and second surgery, the general state of the patient, the operating technique and the experience of the surgical team. Despite progresses made regarding early diagnosis and treatments of surgical complications, mortality following early re-operation are still high (from 15.5% to 61.5%) depending on the severity of complications.¹¹

We recorded 12.6 % mortality; lower than the rates reported in the literature which varies between 26 % and 34.97 %.^{6,10}

Generally the post-operative complications extend the duration of hospitalization especially when it requires a surgical re-intervention. The average duration of hospitalization in our study was 23 days. This duration is shorter than those reported in the literature^{9,8} This is probably because of our relatively short interval between the first surgery and the re-operation and the absence of complication after the re-operation.

Conclusion

The frequency of early re-operations is low in our daily practice. Evisceration remains the number 1 complication requiring a surgical re-intervention.

Risk factors of re-intervention are: indication of first surgery, the operating technique, the experience of the surgical team, malnutrition and anemia.

Conflict of Interest

There is no conflict of interest.

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