

Impact of the acerto project in the postoperative morbi-mortality in a university hospital

Impacto do projeto acerto na morbi-mortalidade pós-operatória em um hospital universitário

ALBERTO BICUDO-SALOMÃO, ACBC-MT¹; MÁRCIO BERTOCCO MEIRELES²; CERVANTES CAPOROSSI, TCBC-MT³; PEDRO LUIS REIS CROTTI, TCBC-MT³; JOSÉ EDUARDO DE AGUILAR-NASCIMENTO, TCBC-MT⁴

A B S T R A C T

Objective: To evaluate the postoperative outcomes of patients in the Department of General Surgery, University Hospital Julio Muller, before and after implementation of the ACERTO multimodal protocol. **Methods:** We conducted a retrospective study from 5974 patients' charts. We compared two periods: from January 2002 to December 2004 (before implementation of the ACERTO protocol: AA period, n = 1987) and January 2005 to December 2008 (after implementation of the protocol: DA period, n = 3987). The variables studied were length of hospital stay, blood transfusions, surgical site infections (SSI), postoperative complications and deaths. **Results:** There was a decrease in one day in length of stay between the AA and DA period (median [range]: 4 [0-137] vs 3. [0-126] days and mode: 3 vs. 2 days, p < 0.001). During AA there was a relationship of 2.53 packs of blood products transfused per patient against 0.77 in the DA period (p < 0.001). A downward trend in the number of cases of SSI was noticeable over the years (A = -153.08; AA: 7.51% vs. DA: 3.36% (p < 0.001, RR = 2.23, 95% CI: 1.73-2.89). There was also a decreasing trend in operative complications (A = - 51.41, AA: 7.9% vs. DA: 6.14%, p = 0.02, RR = 1.29, 95% CI: 1.03-1.60), reoperation (A = - 57.10; AA: 2.65% vs DA: 1.19%, p < 0.001, RR = 2, 22, 95% CI: 1.43 to 3.44) and deaths (A = - 62.07, 2.81 vs. 1%, 73%, p < 0.01, RR = 1.63, 95% CI: 1.15 to 2.31). **Conclusion:** The introduction of the ACERTO protocol improved the surgical results, expressed as a shorter hospital stay, blood transfusion, and reduction in cases of surgical site infection, postoperative complications and deaths.

Key words: General surgery. Preoperative care. Postoperative care. Postoperative complications.

INTRODUCTION

Earlier in this century, based on the new paradigm of evidence-based medicine, new protocols of care for surgical patients began to appear in medical literature. In order to decrease post-operative recovery time, such protocols seek to employ scientifically proven routines rather than those without scientific background, consecrated only by undue reliance on experience¹.

The traditional postoperative care began to be questioned and evidence has shown that many behaviors and practices used in the perioperative period were devoid of scientific support. These are perpetuated simply because they were transferred to new surgeons, from generation to generation, for decades, without proper inquiry. Studies showed that the imposed preoperative and postoperative fasting for extended periods, practiced since the mid-twentieth century, may aggravate the metabolic response

and nutritional status, predisposing patients to systemic inflammatory response syndrome (SIRS) and decrease of immune status. The indiscriminate use of antibiotics, seen as lifeguards, is unfounded and their judicious use not only eliminates costs, but is also safe and prevents bacterial resistance. New advances in anesthesia and analgesia benefit and assist the patients in their early mobility and abbreviated discharge. Misuse of intravenous fluids is extremely deleterious to the patient, which requires strict control on intravenous hydration. The assessment of nutritional status, often neglected, is vital and has a direct impact on the recovery of surgical patients. The bowel preparation, considered by many surgeons as a basic requirement for performing operations on the colon and rectum, may be unnecessary and, more importantly, despite what was believed, could cause harm².

Based on this, in 2005 the Department of Surgery of The Faculty of Medical Sciences, Federal University of

Work done at Department of Surgery, Faculty of Medical Sciences, Federal University of Mato Grosso (UFMT) - MT-BR.

1. Assistant Surgeon, Department of Surgery, FCM / UFMT-MT-BR. 2. Master's Degree Graduate, Post-Graduation Program in Health Sciences, FCM/UFMT- MT-BR. 3. Associate Professor, Department of Surgical Clinic, FCM/UFMT- MT-BR. 4. Professor, Department of Surgical Clinic, FCM/UFMT- MT-BR.

Mato Grosso (FCM - UFMT) began to use a set of routines in the wards of its Surgical Clinic Hospital (Hospital Universitário Júlio Muller - HUJM) in order to accelerate the recovery of patients undergoing abdominal operations¹. Based on the European protocol ERAS², the project involving the implementation of such routines, adapted to the reality of the hospital, was named ACERTO. This name is an acronym for the full name of the project: "accelerating the total recovery" of patients in the postoperative period³. The word "acerto" comes from Latin and means "the act of getting it right," to discover the true, to harmonize, to hit the target³.

Since the implementation of the ACERTO protocol in The Julio Muller University Hospital, no comparative research involving a large number of patients before and after the introduction of the new routines has been undertaken. Published studies focused on outcomes after ACERTO involved only patients treated in the infirmary of Surgery, University Hospital Julio Muller in the 12 months before its establishment to a maximum of two years after⁴. Therefore, this study aims to compare the clinical outcomes, with particular interest to morbimortality, of patients admitted to the HUJM surgical

clinics ward in a period of six years, categorized between 2002 and 2004 (before the ACERTO project implementation) and the years 2005 to 2008 (after implementation of the ACERTO project).

METHODS

This study was submitted to and approved by the Ethics in Research Committee (CEP) of HUJM. We prospectively collected data on 5,974 patients hospitalized in the Department of General Surgery (Surgery Department) of the FCM-HUJM UFMT between January 2002 and December 2008. The research involved two phases: from January 2002 to December 2004, comprising cases admitted before the implementation of the ACERTO protocol (AA period), and another, with patients admitted between January 2005 and December 2008, after implementing the protocol (DA period). Table 1 shows the set of measures established by the ACERTO and conventional regimens that were being applied before it.

The variables compared in the periods DA and AA were: total number of hospitalizations, total number of

Table 1 - Conducts applied in the general surgery ward of HUJM before and after implementing the postoperative ACERTO project².

Conventional Procedures	Procedures recommended by the ACERTO protocol
<ul style="list-style-type: none"> ▪ Minimum preoperative fasting of 8 hours (from the night before surgery). ▪ Initiation of postoperative diet after elimination of flatus or bowel movement (no "ileum"). ▪ Postoperative venous hydration volume of 40ml/kg. ▪ Systematic mechanical preparation of the colon for colorectal operations with mannitol or phospho-soda, with serial rectal washes. ▪ Signing of the procedure informed consent by the patient. ▪ Use of drains, catheters and antibiotics according to the preference of the surgeon. ▪ Early postoperative mobilization. 	<ul style="list-style-type: none"> ▪ Prolonged preoperative fasting not allowed. Indication of carbohydrate-rich liquid diet until the day before the operation, the intake occurring until 2 hours before the operation. Exception: morbid obesity, important gastroesophageal reflux and pyloric stenosis. ▪ In biliary tract surgery, herniorrhaphy and the like, oral liquid diet offered on the same day of surgery (6-12 hours after). In operations with digestive anastomosis, re-introduction of diet on postoperative day 1 (liquid diet) or on the same day of operation. With esophageal anastomosis, diet in the first postoperative day by jejunostomy or naso-enteric tube. ▪ Intravenous hydration should not be prescribed for herniorrhaphy in the immediate postoperative period. Intravenous hydration should be withdrawn 12 hours after cholecystectomy, with few exceptions. For the others, fluid resuscitation until completion of the first postoperative day up to 30 ml/kg/day, with few exceptions. ▪ No routine bowel preparation for colorectal surgery. ▪ Consent and detailed preoperative information to patients. ▪ Encourage the patient to mobilize and start oral intake early. ▪ No use of prophylactic drains or routine nasogastric tube. ▪ Rational and standardized use of antibiotics*. ▪ Ultra-early Mobilization, making the patient walk or sit on the same day of operation for at least 2 hours and for 6 hours in the following days.

procedures, length of hospital stay, wound infection, postoperative complications and deaths. Postoperative complications purported to complications related to operations in the Service, which occurred in the postoperative period and diagnosed during the same period of hospitalization: wall dehiscence, evisceration, wall abscess or collection, active bleeding by surgical wound, suture or anastomosis dehiscence and fistula, cavity abscess or collection, accidental damage to structure(s), bleeding inside hollow viscera, prolonged ileum, cavity bleeding. Surgical site infection was defined according to criteria proposed by mildew et al in 1999⁵. We only evaluated the surgical site infections that were diagnosed during the hospitalization period.

For data analysis we used the Epi-Info package of statistical software, version 2004. Continuous variables were tested for normal distribution with the Kolmogorov-Smirnov test and homogeneity of variances by the Levene test. For parametric data we used the Student t test (data expressed as mean and standard deviation) and for comparisons between nonparametric data, the Mann-Whitney test (data are expressed as median and range). Categorical variables (wound infection, postoperative complications and deaths) were analyzed using the Chi-square test. A value of $p < 0.05$ was adopted as an index of statistical significance. As a measure of the strength of association, we calculated the relative risk (RR) with a range of 95% (95%IC). In comparing data from year to year, trend lines were analyzed by chi-square trend test, verifying, based on the value of the slope (A), the occurrence of an upward trend (positive slope, $A > 0$) or decreasing one (negative slope, $A < 0$).

RESULTS

Between the years 2002 and 2008, 5974 patients were admitted to the HJUM surgical clinic ward, 4634 (77.56%) of which underwent surgical treatment and 1340 (22.44%) only clinical. Nineteen hundred and eighty-seven patients (33.3%) were admitted between 2002 and 2004 (AA period) and 3987 (66.7%) between the years 2005 and 2008 (DA period).

There was a similarity between the two groups regarding their clinical and epidemiological characteristics, as shown in Table 2. Likewise, the surgical procedures performed had similar distribution in the periods DA and AA, which can be seen in Table 3.

We observed an increase towards admissions for surgical treatment ($A = +11.78$) over the years of study and a decreasing trend ($A = -17.08$) for admissions for medical treatment only. Respectively, 1544 patients (77.71%) and 3,090 (77.5%) underwent operative treatment in the periods AA and DA, whilst 443 (22.29%) and 897 (22.5%) underwent medical treatment ($p = 0.88$) only.

There was a decrease in length of stay in one day between the two periods. During AA, the length of stay ranged from 1 to 137 days with a median of four days and three days mode. In the DA period the length of hospitalization ranged from 1 to 126 days with a median of three days and two days mode ($p < 0.001$).

In the AA period 1987 bags of blood products were transfused, corresponding to a ratio of 2.53 bags per patient. During DA, the total number of units was 3987, attesting, as evidenced in Figure 1, a fall to 0.77 in the bag per patient ratio ($p < 0.001$).

It was noted a decreasing number of cases of SSI over the studied years ($A = -153.08$). A trend of decreasing number of cases of postoperative complications ($A = -51.41$) and re-operation ($A = -57.10$) was also observed over the years from 2002 to 2008. The percentage distribution of cases of surgical site infection, postoperative complications and reoperations over the years is depicted in figure 2.

During AA 116 (7.51%) cases of wound infection were diagnosed, compared with 104 (3.36%) cases in the DA period ($p = 0.000001$; RR 2.23, 95% CI: 1.73-2.89). It was also observed a significant decrease in the number of postoperative complications (122/1544, 7.9% vs 190/3090; 6.14%, $p = 0.029$, RR 1.29, 95%: 1.03-1.60) and reoperations (41/1544, 2.65% vs. 37/3090, 1.19%, $p = 0.0004$, RR 2.22, 95% CI: 1.43-3.44) in the two periods, as can be seen in figure 3.

When analyzing the whole observation time of the study, there was a decreasing trend ($A = -62.07$) of the percentage of deaths (Figure 4). Of these, 56 (2.81%) occurred in the AA period and 69 (1.73%) in the DA ($p = 0.0075$, RR: 1.63, 95% CI: 1.15 -2.31), as shown in figure 5.

DISCUSSION

Several studies, mainly of colorectal operations, recently grouped in a meta-analysis, confirm the improvement of postoperative results with the application of multimodal protocols (fast track) of surgical patient care^{2,6}. These protocols bring to light, over the eyes of evidence-based medicine, old paradigms embodied by empiricism related to clinical management of these patients and imply the need for extensive review of conduct.

The implementation of the multimodal protocol ACERTO in 2005 in HJUM FCM-UFMT was a pioneering experience in our country³. The protocol was initially applied in patients undergoing abdominal surgery and was quickly incorporated into other specialties (Head and Neck, Urologic, Thoracic, Plastic, Vascular and Maxillo-Facial Surgeries). Its first results, published about a year after its implementation, were successful in incorporating the practices recommended by members of the Department

Table 2 - Patients admitted to the periods before (AA) and posterior (DA) to the implementation of the ACERTO protocol.

AA					DA					p
Hospital Admissions	1987				3987					
Gender	Male	Female			Male	Female				NS
	969	1018			1621	1517				
Mean age	46	± 17,3			46	± 22,3				NS
Origin	Cuiabá	Interior	MT	Other States	Cuiabá	Interior	MT	Other States	NS	
	1169	672		146	2080	982		76		
	58,8%	33,8%		7,3%	52,2%	24,6%		1,9%		
Operated cases	1544				3090					NS
	77,7%				77,5%					
Operative priority	Elective	Urgent			Elective	Urgent				NS
	1411	133			2852	238				
	91,4%	8,6%			92,3%	7,7%				
Operative approach	Open	Laparoscopic			Open	Laparoscopic				P<0,05
	1359	185			2531	559				
	88%	12%			81,9%	18,1%				
Malignancies	256				488					NS
	16,6%				15,8%					
IMC* (e±DP)	24±5,8				24 ±6,1					NS
ASA* classification	I	II	III	IV	I	II	III	IV	NS	
	757	547	250	0	1526	1069	494	0		
	48,7%	35,2%	16,1%	0	49,4%	34,6%	16%	0		
Class	Clean	Clean-contaminated	Contaminated	Infected	Clean	Clean-contaminated	Contaminated	Infected	NS	
	314	1044	174	22	658	2098	300	34		
	20,2%	67,2%	11,2%	1,4%	21,3%	67,9%	9,7%	1,1%		

* Body Mass Index (Kg/m²); ** American society of anesthesiologists.

and, ultimately, brought improvement to the parameters of morbidity in the Service¹.

In this study we evaluated 3,090 patients treated after implementation of the ACERTO multimodal protocol. It is the largest sample of patients undergoing such a protocol studied in our country and perhaps in America. It is important to note that in this sample there are not only operations of the digestive tract, where the protocol ACERTO is applied in virtually all of their routines, but also in surgical areas of interest to the HUJM Department of Surgery.

Though the physical structure of the ward remained unchanged as for the number of beds available

for hospitalization between 2002 and 2008, there was an increasing trend line with respect to total admissions, especially those that involved surgical treatment. As already shown in other studies evaluating multimodal protocols⁷, this result reflects a higher turnover of beds, increasing the number and earliness of hospital discharges. The question that arises at this point is whether the increase in the number of admissions has been boosted (or in some ways influenced) by an increase in the number of readmissions after the implementation of the ACERTO protocol.

In a recent meta-analysis, Varadhan et. al⁶ showed no increase in the percentage of readmissions motivated by the use of multimodal protocols in colorectal

Table 3 - Operations performed in the periods before (AA) and posterior (DA) to the implementation of the ACERTO protocol.

Scale of operation procedures		AA Period						DA Period					p
		2002	2003	2004	Total	%	2005	2006	2007	2008	Total%		
1	Open cholecystectomy	72	60	69	201	13,0%	98	158	182	128	566	18,3%	
1	Inguinal hernia repair	40	28	37	105	6,8%	66	87	65	58	276	8,9%	
1	Laparoscopic cholecystectomy	0	13	17	30	1,9%	51	48	34	13	146	4,7%	
1	Thyroidectomy	3	12	17	32	2,1%	24	29	28	13	94	3,0%	
1	Surgery of the urethra	0	8	4	12	0,8%	21	12	13	9	55	1,8%	
1	Anorectal surgery	19	18	18	55	3,6%	11	19	18	0	48	1,6%	
1	Mammoplasty	32	18	20	70	4,5%	5	3	21	15	44	1,4%	
1	Appendectomy	5	0	8	13	0,8%	9	12	11	8	40	1,3%	
1	Facial plastic surgery	11	3	6	20	1,3%	7	8	9	8	32	1,0%	
1	Gastrostomy	3	2	10	15	1,0%	1	11	10	4	26	0,8%	
1	Jejunostomy	0	4	3	7	0,5%	5	5	4	4	18	0,6%	
1	Varicocele	33	2	12	47	3,0%	0	0	9	0	9	0,3%	
1	Lower limbs varices	22	17	22	61	4,0%	2	2	4	0	8	0,3%	
1	Abdominoplasty	9	5	2	16	1,0%	1	0	5	1	7	0,2%	
Sub-total 1		249	190	245	684	66,4%	301	394	413	261	1369	63,5% <0,05	
2	Exploratory laparotomy	0	17	16	33	2,1%	12	84	34	18	148	4,8%	
2	Complex incisional hernia	17	13	17	47	3,0%	11	36	29	25	101	3,3%	
2	Colorectal Surgery	22	18	18	58	3,8%	20	16	27	34	97	3,1%	
2	Prostate Transurethral Resection	13	8	10	31	2,0%	15	23	21	17	76	2,5%	
2	Prostatectomy	4	7	12	23	1,5%	9	20	26	17	72	2,3%	
2	Thoracotomy	6	4	4	14	0,9%	9	30	11	12	62	2,0%	
2	Gastrectomies	7	6	8	21	1,4%	26	8	9	7	50	1,6%	
2	Bariatric Surgery	0	4	9	13	0,8%	8	14	4	10	36	1,2%	
2	Correction of gastro-esophageal reflux	5	3	5	13	0,8%	6	8	12	7	33	1,1%	
2	Nephrectomy	3	7	5	15	1,0%	5	6	7	9	27	0,9%	
2	Bileo-digestive anastomosis	7	9	13	29	1,9%	6	6	4	8	24	0,8%	
2	Esophagectomy	4	2	2	8	0,5%	3	3	4	6	16	0,5%	
2	Pneumonectomy	2	5	5	12	0,8%	3	4	4	3	14	0,5%	
2	Surgery of megaesophagus	4	1	3	8	0,5%	3	0	6	3	12	0,4%	
2	Pancreatectomy	8	2	4	14	0,9%	6	2	1	2	11	0,4%	
2	Hepatectomy	0	3	4	7	0,5%	2	0	3	2	7	0,2%	
Sub-total 2		102	109	135	346	33,6%	144	260	202	180	786	36,5% <0,05	
	Miscelaneus	164	196	154	514	33,3%	204	153	296	282	935	30,3% <0,05	
Total		515	495	534	1544	100%	649	807	911	723	3090	100%	

(1) Small and medium scale procedures

(2) Major scale procedures

surgery. Nevertheless, as this variable was not computed in the database studied in the initial years of data collection (2002-2005) of this study, it is not possible to accurately solve this issue.

The results showed an economy in the number of hospital stays for patients undergoing multimodal protocol. It should be emphasized that in this study patients undergoing small and medium operations were computed, as well as those undergoing major ones. In fact, there was an overall reduction of one day of admission, as evidenced by median values and especially mode. Applying this finding to the number of operations performed annually by SUS⁸ (Brazilian Healthcare System), one can imagine the important contribution of this type of protocol in the reintegration of the surgical patient to the home environment, costs for the system and also in increasing

the number of procedures. The potential cost reduction is noteworthy, especially for teaching hospitals where there are higher financial costs involved in professional tutoring and education⁹, allowing the expansion of health care to a broader range of patients¹⁰.

By evaluating the sample presented here, we observed that there was an increase of laparoscopic operations during DA (18.1% vs. 12% in the AA). We know that one of the great advantages of minimally invasive surgery is exactly the faster postoperative recovery, less surgical manipulation, less postoperative pain and, consequently, earlier discharge and social rehabilitation¹¹. Hence, these numbers may have been influential in our morbidity data, especially concerning the reduction of hospital days. However, it should be borne in mind that the use of minimally invasive operations, oblique incisions and,

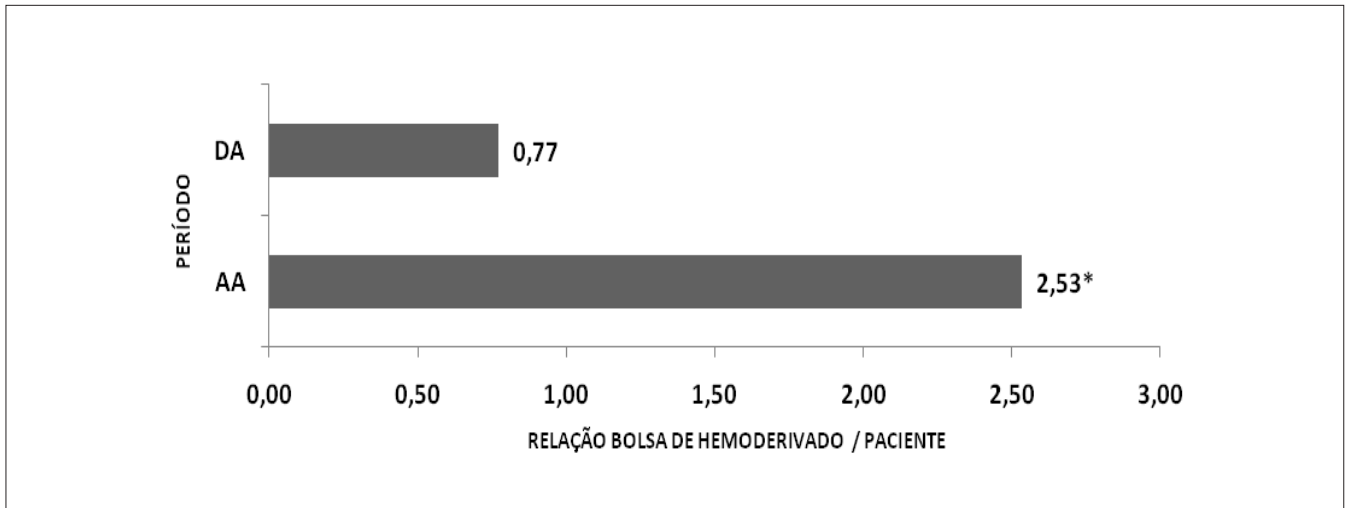


Figure 1 - Ratio of blood product packs per patient during the two periods studied ($p < 0.001$ vs. DA).

DA: period after the implementation of the ACERTO protocol.

AA: period before the implementation of the ACERTO protocol.

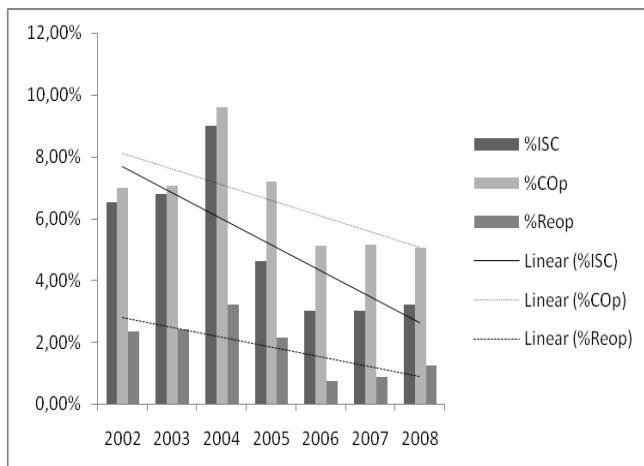


Figure 2 - Percentage of cases of surgical site infection (ISC), postoperative complications (COp) and reoperations (Reop) between the years 2002 and 2008.

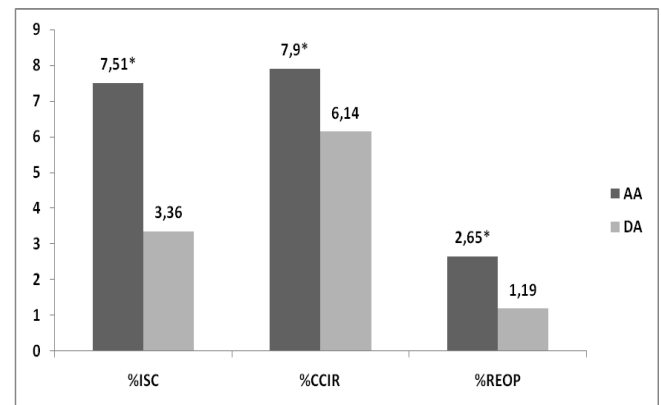


Figure 3 - Percentage of surgical site infection (%ISC), postoperative complications (%CCIR) and reoperations (%Reop) diagnosed before (AA) and after (DA) the implementation of the ACERTO protocol (* $P < 0.05$ vs DA).

particularly, the use of laparoscopy, are important premises of multimodal protocols¹². For ACERTO it is not different. One of the key points made in its implementation has been the use of laparoscopic whenever possible³. Thus, the figures shown here reflect nothing more, nothing less, than the growing use of one of the conducts inherent to multimodal protocols and, therefore, corroborate the improvement of overall results.

Notable was the decrease in cases of surgical site infection and postoperative complications. Patients operated after the protocol implementation had two times less chance of getting a surgical site infection, and were approximately 1.5 times less likely to have postoperative complications. The importance given to the more serious

postoperative complications is emphasized. Here we are interested in those complications that led to a second surgical intervention for purposes of treating it. Also in this regard, the numbers are quite clear. We noticed a very significant decrease in the percentage of reoperations (2.65% to 1.19%, $p = 0.0004$), with a relative risk that allows us to infer two to three times less likelihood of the patient being reoperated due to a postoperative complication (RR 2.22, 95%CI: 1.43-3.44).

Still in the assessment of severity criteria for hospitalized patients, this study investigated the number of units of blood products transfused per patient. The employed index (pack/patient) resulted in an analyzable variable, since there were no changes in the policy for indication of

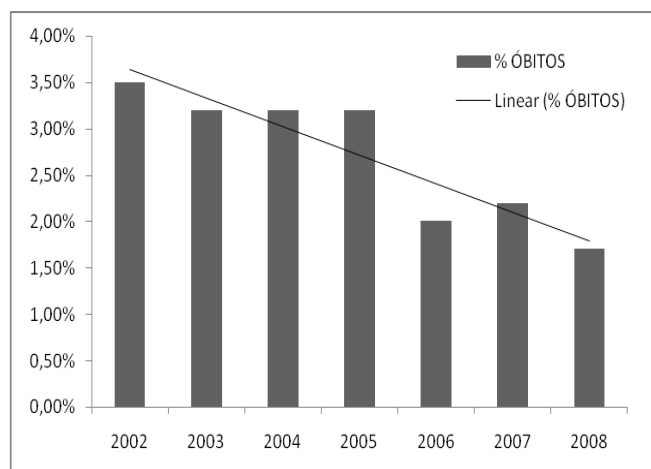


Figure 4 - Percentage of deaths among patients admitted to the HJUM Surgical Clinic ward between 2002 and 2008.

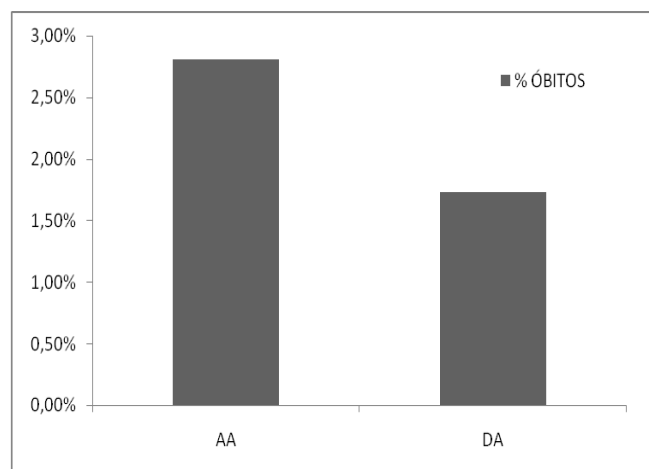


Figure 5 - Percentage of deaths among patients admitted to the HJUM Surgical Clinic ward of the periods before (AA) and after (DA) the implementation of the ACERTO protocol ($p = 0.0075$ vs DA).

transfusion of blood components in the service during the years of the study. The fall in the ratio of blood product packs per patients was from about two units in the pre-ACERTO (AA) to less than one during it (DA). Once again we have a variable that translates into cost savings to the government. Another point that we must mention is that in our sample about 16% of patients in both periods were suffering from malignancy. It is a well established fact in the literature that blood transfusion for this group of patients is related to a worse prognosis for their primary disease¹³. It is therefore an interesting aspect, where patients experienced benefits from the implementation of the multimodal protocol.

The sample size allowed us to determine the impact of implementing the protocol on the mortality of hospitalized patients. Over the years there has been a downward trend line for the number of deaths in the Service. Emphatically, the percentage of deaths in the period before implementation of the protocol was 2.81%, with a decrease in the period after the implementation of the protocol to 1.73% ($p=0.0075$). These results showed that the chance of death with the use of the ACERTO Protocol was 1.6 times lower (95%CI: 1.15-2.31).

The results of this study lead us to believe that the use of multimodal protocols is a trend that will mark the surgery in the beginning of this century. They will gradually become part of everyday life of the wards of public and private institutions in almost its entirety. The data presented here are nevertheless part of a prospective-retrospective cohort study and therefore possess all the limitations of this methodology in terms of decision making. Thus, there is a clear need for new studies with this same theme in our country, but with a stronger methodology from the viewpoint of evidence. Furthermore, based on the results presented here, we conclude that, in the ward of Clinical Surgery, University Hospital Julio Muller, the application of the ACERTO multimodal protocol determined a significant improvement in morbidity and mortality in general surgery.

R E S U M O

Objetivo: Avaliar resultados pós-operatórios de pacientes do Serviço de Cirurgia Geral do Hospital Universitário Julio Muller antes e após a implantação do protocolo multimodal ACERTO. **Métodos:** Estudo retrospectivo em fichas preenchidas prospectivamente referentes a 5974 pacientes. Foram comparadas duas fases: de Janeiro de 2002 a Dezembro de 2004 (antes da implantação do protocolo ACERTO: período AA, $n=1987$); e de Janeiro de 2005 a Dezembro de 2008 (após a implantação do mesmo: período DA, $n=3987$). Comparou-se tempo de internação hospitalar, hemotransfusões realizadas, infecções de sítio cirúrgico (ISC), complicações operatórias e óbitos. **Resultados:** Houve uma diminuição em um dia no tempo de internação entre o período AA e DA (mediana [variação]: 4 [0-137] vs. 3 [0-126] dias e moda: 3 vs. 2 dias; $p<0,001$). No período AA houve uma relação de 2,53 bolsas de hemoderivados transfundidas por paciente contra 0,77 no período DA ($p<0,001$). Notou-se tendência decrescente no número de casos de ISC ao longo dos anos estudados (AA=153,08; AA:7,51% vs. DA: 3,36% ($p<0,001$; RR=2,23; IC95%:1,73-2,89). Houve ainda tendência decrescente em relação a complicações operatórias (AA=51,41; AA:7,9% vs. DA: 6,14%; $p=0,02$; RR=1,29; IC95%:1,03-1,60), reoperações (AA=57,10; AA:2,65% vs. DA:1,19%; $p<0,001$; RR=2,22; IC95% 1,43-3,44) e óbitos (AA=62,07; AA:2,81% vs. DA:1,73%; $p<<0,01$; RR=1,63; IC95%:1,15-2,31). **Conclusão:** A introdução do protocolo ACERTO proporcionou melhora dos resultados cirúrgicos, expressos por menor tempo de permanência hospitalar, uso de hemoderivados, e diminuição dos casos de infecção do sítio cirúrgico, complicações operatórias e óbitos.

Descritores: Cirurgia geral. Cuidados pré-operatórios. Cuidados pós-operatórios. Complicações pós-Operatórias.

REFERENCES

1. Aguilar-Nascimento JE, Bicudo-Salomão A, Caporossi C, Silva RM, Cardoso E A, Santos TP. Acerto pós-operatório: avaliação dos resultados da implantação de um protocolo multidisciplinar de cuidados peri-operatórios em cirurgia geral. *Rev Col Bras Cir* 2006;33(3):181-8.
2. Fearon KC, Ljungqvist O, Von Meyenfeldt M, Revhaug A, Dejong CH, Lassen K, Nygren J, Hausel J, Soop M, Andersen J, Kehlet H. Enhanced recovery after surgery: A consensus review of clinical care for patients undergoing colonic resection. *Clin Nutr*. 2005; 24(3):466-77.
3. Aguilar-Nascimento JE, Caporossi C, Bicudo-Salomão A. ACERTO: acelerando a recuperação total no pós-operatório. Cuiabá: Edufimt. 2009. 177p.
4. Aguilar-Nascimento JE, Bicudo-Salomão A, Caporossi C, Silva RM, Cardoso EA, Santos TP. Enhancing surgical recovery in Central-West Brazil: The ACERTO protocol results. *e-SPEN*. 2008;3(2):e78-e83.
5. Mangram AJ, Horan TC, Pearson ML, Silver LC; Jarvis WR. Guidelines for prevention of surgical site infection. *Infect Control Hosp Epidemiol*. 1999; 20(4):247-80.
6. Varadhan KK, Neal KR, Dejong CH, Fearon KC, Ljungqvist O, Lobo DN. The enhanced recovery after surgery (ERAS) pathway for patients undergoing major elective open colorectal surgery: a meta-analysis of randomized controlled trials. *Clin Nutr* 2010;29(4):1-7.
7. Kehlet H, Wilmore DW. Multimodal strategies to improve surgical outcome. *Am J Surg* 2002;183(6):630-41.
8. DATASUS – “Centro Tecnológico de Informação e Informática do SUS”. Disponível em <http://www.datasus.gov.br/DATASUS/index.php?arca=01>.
9. Chandawarkar RY, Taylor S, Abrams P, Duffy A, Voytovich A, Longo WE, Kozol RA. Cost-aware care: critical core competency. *Arch Surg* 2007;142(3):222-6.
10. Stephen AE, Berger DL. Shortened length of stay and hospital cost reduction with implementation of an accelerated clinical care pathway after elective colon resection. *Surgery* 2003;133(3):277-82.
11. McLauchlan GJ, Macintyre IM. Return to work after laparoscopic cholecystectomy. *Br J Surg* 1995;82(2):239-41.
12. Anderson DA, McNaught CE, MacFie J, Tring I, Baker P, Mitchell CJ. Randomized clinical trial of multimodal optimization and standard perioperative surgical care. *Br J Surg* 2003;90(12):1497-504.
13. Dogan L, Karaman N, Yilmaz KB, Ozaslan C, Atalay C, Altinok M. Characteristics and risk factors for colorectal cancer recurrence. *J BUON* 2010;15(1):61-7.

Received 03/01/2010

Accepted for publication 25/02/2010

Conflict of interest: none

Source of funding: none

How to cite this article:

Bicudo-Salomão A, Meireles MB, Caporossi C, Crotti PLR, Aguilar-Nascimento JE. Impact of the acerto project in postoperative morbi-mortality in a university hospital. *Rev Col Bras Cir*. [periódico na Internet] 2011; 38(1). Disponível em URL: <http://www.scielo.br/rcbc>

Correspondence to:

José Eduardo de Aguilar-Nascimento

E-mail: Aguilar@terra.com.br