Impact of delayed patient flow on surgical outcomes after hip fracture

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Impact of delayed patient flow on surgical outcomes after hip fracture: an observational study

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Editor,

The incidence of hip fracture (HF) is 330/100,000 inhabitants per year in Europe, and is going on increasing with population growing older. HF are associated with high morbidity and mortality in patients, with nearly 13,3% of deaths at one month after surgery and reaching 24,5% at one year.[1] The risk factors of morbidity and mortality are numerous and, for the most part, unavoidable (advanced age, male sex, lack of previous autonomy).[2] Large recent retrospective studies document that a surgical delay of more than 24 hours between the patient's arrival in the emergency room and the surgical procedure could be associated with an increase in mortality and in the incidence of pneumonia, myocardial infarction, and pulmonary embolism at 30 days.[2,3] It is consequently considered that HF patients have to be operated as soon as possible. However, the average operating time was estimated at 32.7 hours in the United Kingdom in 2016, and varies between centers.[4] Several reasons account for delayed surgery including patient's condition and co morbidities, treatments (especially anticoagulant) and the completion of further medical investigations.[5] But no previous studies maked the difference between medical issues and organizational constraints causing surgical delay. We hypothesize that delaying HF surgery for this last reason does not increase postoperative morbidity and mortality.

We conducted a data-based, monocentric, observational, study in an university hospital (Hôpital Saint-Antoine, Assistance Publique-Hôpitaux de Paris, France). All patients older than 45 years, admitted and operated for a HF between March 1, 2018 and March 1, 2019, were included. The objectives were to determine the proportion of patients with delayed management (>24 hours) due to organizational constraints (OC group) and to compare their prognosis with patients operated in the 24 first hours (early surgery group (ES)). This observational study obtained an IRB approval (Comité d'Ethique pour la Recherche en Anesthésie Réanimation CERAR, June 23, 2019, #IRB00010254-2019-074). We collected and integrated the informations in anonymised forms into a secure database registered in the AP-HP treatment register (#20191121120100) in accordance with the CNIL MR-004 methodology.

Patient and management characteristics were compared between groups using Mann-Whitney-Wilcoxon and Fisher tests, respectively. Independent factors associated with the risk of post-operative complications were identified by logistic regression.

A total of 384 patients underwent surgery for HF under general or epidural anesthesia during the one-year period of the study, including 184 femoral neck fractures and 200 per-trochanteric fractures. The median time to surgery was 24.7 hours IQR [18.8 to 37.8]. We found that 49.7% (191 patients) were conducted to surgery within 24 hours (ES group) with a median time of 19.1 hours (IQR [14.6 to 21.9]), and 33% (127 patients) had surgery delayed due to organizational constraints (OC group) with a median time to management of 30.9 hours (IQR [26.6 to 44.3]). The two groups had comparable characteristics, except for two of them: a lower prevalence of femoral neck fractures in the ES group compared to the OC group (41.4% (79 patients) *vs* 55.9% (71 patients) respectively, p=0.01); and a lower percentage of patients operated under general anaesthesia in the ES group (51.8% (99 patients) *vs* 64.6% (82 patients), p=0.02).

No significant difference was found in terms of postoperative complications between the "ES" group and the "OC" group: 36.6% (70 patients) *vs* 45.7% (58 patients) respectively (p=0.079)**.** No statistically significant difference either was found in terms of post-operative length of stay; intra-hospital mortality and the need for resuscitation or ICU (***Table1***). Multivariable analysis identified increased age (OR= 1.08 [1.05 to 1.12] per 10-year age group) and an ASA score > 1 (OR= 6.08 [2.16 to 22.04] for ASA = 2 and OR=9.04 [3.02 to 34.18] for ASA ≥ 3) as independent risk factors for postoperative complications in the OC group. Conversely, sex and type of fracture were not.

This observational study is the first, to our knowledge, to document that postponing surgery for more than 24 hours for organizational reasons has no statistical significant impact on post-operative morbidity and mortality. Comorbidities and the need to stop treatments before surgery (most commonly anticoagulants) have been commonly advocated for postponing surgery. However, this attitude has not proven to be effective so far, in the overall management of HF.[5] Our data suggest that the reasons for delaying management have more impact on the patient's prognosis than the delay itself. The medical status of the HF patients seems to be the most significant factor of morbidity and mortality after delayed surgery.

In a same manner, Borges et al. in the "Hip attack" study, don't show any difference in terms of mortality and postoperative morbidity at 90 day, between a standard of care and an accelerated surgical programme (surgery within 6 hours), in HF patients who did not have an anticoagulation therapy.[6] Many studies have documented an increased postoperative mortality when emergency surgery is performed during the "non-working hours" (during nightshifts).[7]

The current study raises the point of the benefit-risk balance of operating HF patients in less than ideal conditions, including at night.

This study has several limitations. First, although the multivariable analysis, its observational nature does not make possible to rule out residual confusion and indication bias. Next, there is a medical pre-screening for the operation theatre, prioritizing care of patients considered to be the most fragile or patients for whom the minimum duration of treatment interruption is desired (especially anticoagulants). The monocentric design also limits the extrapolation of the results and the median time to surgical management of hip fracture is particularly short in our centre. Lastly, the assessment of complications was performed at the end of hospital stay: the late consequences of patients' management were not evaluated.

In conclusion, postponing HF surgery for more than 24 hours for organizational reasons may not represent a risk factor for patients and highlights the importance of other factors, such as the medical status, as determinants of postoperative morbidity and mortality in HF patients.

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TABLE

Table 1: Comparison of the rate of perioperative complications between the "early surgery" (ES) group and the "organizational constraint" (OC) group

	ES group *n= 191*	OC group *n=127*	**P***
Post-operative complications	70 (37%)	58 (45%)	0.08
Cardiac	19 (10%)	13 (10%)	1.00
Infections	17 (9%)	11 (8%)	1.00
Neurological	43 (22%)	29 (23%)	0.89
Surgical	5 (2%)	2 (2%)	0.71
DVT or PE	1 (0.5%)	0 (0%)	1.00
AKI (Kdigo≥2)	12 (6%)	8 (7%)	0,63
Intraoperative norepinephrine requirement	13 (7%)	7 (6%)	0.81
Intraoperative transfusion	12 (6%)	11 (9%)	0.51
ICU stay (*n*)	2 (1%)	1 (0.8%)	1.00
Post-operative death	5 (3%)	3 (2%)	1.00
Length of post-operative stay (days) median [IQR]	8.3 [6.3 to 12.0]	9.00 [6.0 to 12.0]	0.54
Total functional recovery before end of hospital stay (*n*)	85 (45%)	58 (46%)	0.70

*AKI = Acute Kidney, injury, DVT = Deep Vein Thrombosis. PE = Pulmonary Embolism. ICU = Intensive Care Unit. * P-values from Mann-Whitney-Wilcoxon or Fisher tests*