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# Establishing a written advice sheet to patients consulting for wound to emergency ward improves postemergency care

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## Abstract:

**OBJECTIVES:** Sutures require follow-up visits for favorable evolution. To improve postemergency wound care, we decided to include a standardized advice sheet for patients based on current recommendations. The objective is to assess its effectiveness on outpatients' compliance after being discharged from the emergency department (ED).

**METHODS:** We performed a prospective, pre–post design trial in an ED of a teaching hospital. We included for two consecutive months all patients aged  $\geq 16$  years old and consulting for wounds that needed suturing, and we excluded chronic wounds, burns, and hand wounds since they all need special care. During the 1<sup>st</sup> month, all patients received during ED visit usual verbal instructions concerning the postemergency care (Group A). During the 2<sup>nd</sup> month, all patients received usual verbal instructions and a standardized written advice sheet that detailed postemergency wound care (Group B). We organized telephone follow-up after the suture removal date and asked about dressing changes, appearance of infection signs, and respect of suture removal date. We compared patients' characteristics in the two groups and performed a multivariable logistic regression using compliance to discharge instructions as our endpoint.

**RESULTS:** For 2 months, 509 patients consulted for wounds. 119 (23.4%) patients were included in the study and followed. Baseline characteristics of patients did not differ between the two groups. Patients who received the advice sheet (Group B) had a better compliance in postemergency care (91.7% vs. 72.9%;  $P=0.01$ ). Moreover, there were significantly less dressing changes in Group B than in Group A (5.3 [2.2] vs. 12.9 [7.7];  $P<0.01$ ) and suture removal date was more in agreement with recommendations in Group B (83.9% vs. 66.7%;  $P=0.03$ ). Occurrence of infection was not significantly different between groups (9.7% vs. 13.7%;  $P=0.37$ ).

**CONCLUSION:** For the management of wound care, discharge hospital process including a written advice sheet improves outpatients' compliance and postemergency care.

## Keywords:

Emergency department, follow-up compliance, wound

## Introduction

Wounds and lacerations represent up to 13% of the consultations to the

emergency department (ED).<sup>[1,2]</sup> During emergency management, patients receive discharge instructions from their doctors concerning wound care and signs of complications. Usually, little time is allocated to providing discharge instructions and

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### Box-ED

#### What is already known on the study topic?

Postdischarge wound care is crucial for wound healing.

#### What is the conflict on the issue? Has its importance for readers?

Much controversy and practice variation exist regarding the discharge instructions for postclosure wound care in the emergency setting

These variations concern the use of dressing and the frequency of dressing changes, the use of antiseptic or soap, and the optimal suture removal date

There are not standardized instructions for postclosure wound care.

#### How is this study structured?

This was a single-center, prospective pre–post study including data from approximately 200 patients.

#### What does this study tell us?

Combined verbal and written instructions improve patients' compliance to wound care

Discharge instruction should be short, simple, and clear

Wound healing involves patients' compliance.

demonstrations of wound care. Therefore, patients might not be clear about the discharge instructions and thus are at risk for not following wound care<sup>[3]</sup> and for additional complications such as infection, dehiscence, or bad cosmetic results.<sup>[4-6]</sup>

There is a wide variety of hospital discharge organization process (verbal or written instructions, follow-up calls, or smartphone applications), but there is currently no formal process for assessing patients' compliance.<sup>[7]</sup>

To improve patients' compliance to wound care, we implemented an advice sheet based on consensus conference recommendations and gave it to injured patients.<sup>[8]</sup> Our goal was to compare follow-up compliance for ED patients with two different discharge organization processes. We also evaluated several patients and wound characteristics as possible factors affecting greater outpatient follow-up compliance.

## Methods

### Study design, setting, and selection of participants

APHP Research Ethics Review Committee approved the investigation with waiver of informed consent (IRB00011591, 10 January 2019). This study was a prospective clinical trial at an ED in a teaching hospital. During two consecutive months, we included all patients aged sixteen years and over consulting for a wound that needed suturing. Exclusion criteria were chronic wounds, burns, and hand wounds. During the 1<sup>st</sup> month, all patients were given usual verbal discharge

instructions by the health professionals regarding the postemergency care (Group A). During the 2<sup>nd</sup> month, in addition to usual verbal discharge instructions, all included patients were given a written advice sheet [Appendix 1]. Patients from this second period composed the Group B. All patients were called on the phone after the suture removal date and asked about the respect of discharge written instructions from the advice sheet: dressing changes, appearance of infection signs, and respect of suture removal date [Appendix 2].

### Sample size calculation

Assuming an adherence rate of 70% with only verbal discharge instructions and 90% with the advice sheet, it is necessary to include 118 patients for a power of 80% and a one-sided significance level of 5%.

### Data collection

During the ED visit, we recorded data about wound characteristics including location, size, time delay from injury to ED visit, signs of infection (inflammatory signs and secretion), suture technique used (simple stitches or staples), and number of sutures. We also recorded patient characteristics (age and sex) and circumstance of incident (workplace or domestic incident). After ED discharge, each patient that had been sutured was called 1 or 2 days after the recommended removal date. To ascertain if patients followed up discharge instruction, we established for both groups a single standardized questionnaire based on the Bates–Jensen Wound Assessment Tool.<sup>[9]</sup> The assessment of compliance for following instructions was based on patient self-reports, changing dressing counts, and rates of prescription refills [Appendix 2]. Patients were asked about number of dressing changes, appearance of infection signs, use of antiseptic, adherence to discharge instruction, and suture removal date. The data were collected by the first (R.C.) and the second authors (T.T.).

### Outcomes

Our main outcome was proportion of compliant patients in each group. Compliance was defined as acting according to emergency health professional's recommendation. Compliance with wound healing was determined by the telephone interview. Patients were asked, "On discharge, were any medications advised for you?" and "Were you able to fill these prescriptions after your ED visit?" Patients were defined as noncompliant with prescription filling if they answered affirmatively to the former question and negatively to the latter.

### Measurements Written advice sheet

Written advice sheet is based on evidence-based recommendations.<sup>[5,8,10]</sup> The aim of the written advice sheet is to inform patients about how to manage their wound and to limit complications. The written advice

sheet is composed of 3 parts: suture removal date according to wound location, procedural steps of the wound care, and listing of signs of complications. The procedural steps of wound care included dressing application instructions, dressing change frequency, discarding of supplies, and aseptic procedure. To minimize the number of documents at the ED discharge, the written advice sheet is included at the end of the physician's prescription for medication.

### Statistical analysis

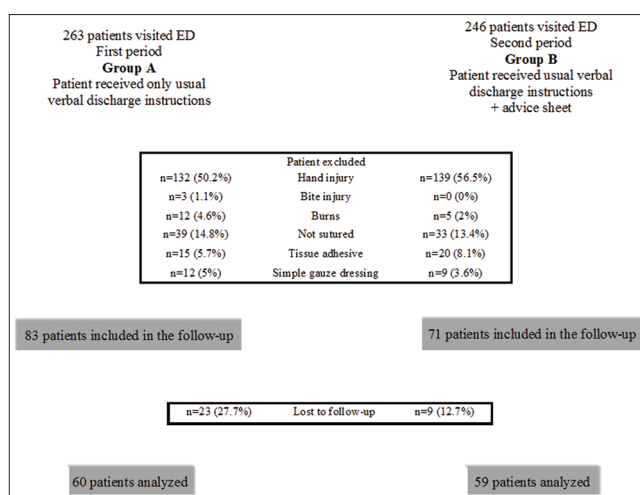
Continuous data were expressed as mean ± standard deviation (SD). Categorical data were expressed as frequencies and percentages. In the case of absence of linearity, continuous variables were dichotomized according to the median. Comparisons used the Chi-square test for categorical variables and Student's *t*-test or Mann-Whitney-Wilcoxon test, when appropriate, for continuous variables. Patients were compared according to their group (A or B). The primary endpoint was follow-up compliance and the secondary was the incidence of reported infections based on patient symptomatology. We performed a multivariable logistic regression to evaluate the association between follow-up compliance, group, and prognostic factors.

All analyses were two-sided and a *P* value below 0.05 was considered to be statistically significant. Statistical analysis was performed using R studio software (R Development Core Team (2019), Vienna, Austria).

### Results

During the study, 509 patients visited the ED for traumatic laceration. Of these, 271/509 (53.2%) patients had a hand laceration, 3/509 (0.006%) had a bite injury, 17/509 (0.03%) had burns, 7/509 (0.01%) presented a delay injury/trauma to ED visit too long (>6 h) to allow suturing, 35/509 (0.07%) received tissue adhesive, and 21/509 (0.04%) were treated with simple gauze dressing and thus were not included in the analysis. During the follow-up period, 31/509 (0.06%) were lost (not answering to telephone calls or wrong telephone number). Finally, *n* = 119/509 (23.2%) were followed up and included in the analysis: 59 out of 119 (49.6%) during the period A and 60 out of 119 (50.4%) in the period B [Figure 1]. The mean age (SD) was 50.7 (±23.9), and 70/119 (58.8%) were male. Wounds were distributed on the face (*n* = 84 [70.6%]), upper limb (*n* = 18 [15.1%]), lower limb (*n* = 15 [12.6%]), and trunk (*n* = 2 [0.02%]).

At the ED presentation, there was no significant difference between the Group A and B in terms of delay from injury to wound closure, wound size, numbers of sutures, cleaned and contained wound, the use of antiseptic, injury site, time recommended to sutures' removal,



**Figure 1:** Flow chart of patient during the study period. Patients received respectively only usual oral discharge instructions or usual oral discharge and advice sheet, in Group A and Group B. \*ED: Emergency Department

wound length, and environmental context (workplace and domestic accidents). Overall, the adherence rate to discharge instructions was 82.4% (98/119) [Table 1].

During the postemergency care period after discharge from ED, there was no significant difference (*P* > 0.05) between the Group A and the Group B, in terms of antiseptic use or standard soap with water, wound complications occurrence such as infection, minor dehiscence or erythema, duration of work stoppage, and short-term unscheduled return rate. The Group B had significantly higher adherence to wound care instructions (91.7 vs. 72.9%, *P* = 0.02) and a higher mean number of dressing changes (5.45 vs. 12.9, *P* = 0.001), and their suture removal date was more in agreement with recommendations (83.9% [*n* = 52] vs. 66.7% [*n* = 40]; *P* = 0.03) [Table 1]. Occurrence of infection was not significantly different between Group B and A (9.7% [*n* = 6] vs. 13.7% [*n* = 8]; *P* = 0.37). We did not observe a significant difference regarding clinical and wound characteristics between compliant and noncompliant patients [Table 2].

After adjusting on patients and wound cofounders (age, gender, wound size, adequation to suture removal date, and the use of standard soap with water), the hospital discharge process using an additional written advice sheet (Group B) is significantly associated with follow-up compliance (adjusted odds ratio: 4.25 [1.22–18.2]) [Table 3].

### Discussion

In this study, we observed a significant relationship between the hospital discharge process that included verbal instructions and written advice sheet and patients' compliance for wound care. Even after adjustment for patients' and wounds' characteristics, the use

**Table 1: Baseline characteristics of patients according to Group A or B**

	Group A 59/119	Group B 60/119	P
Male, <i>n</i> (%)	37 (62.7)	33 (55.0)	0.50
Age, mean (SD)	48.9	52.4	0.49
Site of injury, <i>n</i> (%)			
Lower extremity	8 (13.6)	7 (11.7)	0.50
Upper extremity	10 (16.9)	8 (13.3)	
Trunk	0	2 (3.3)	
Face	41 (69.5)	43 (71.7)	
Time from injury to wound closure under 6 h, <i>n</i> (%)	56 (94.9)	60 (100.0)	0.23
Suture performed by senior physician	29 (49.2)	21 (35.0)	0.16
Wound size, mean (SD)	3.83	4.02	0.70
Number of stitches (%)	4.89	4.13	0.29
Initial aspect of wound is clear, <i>n</i> (%)	54 (91.5)	53 (88.3)	0.81
Work-related accident, <i>n</i> (%)	8 (13.6)	6 (10.0)	0.75
Work stoppage prescribed, <i>n</i> (%)	4 (6.8)	5 (8.3)	0.99
Postdischarge wound care			
Average delay to suture removal, <i>n</i> (%)	9.32	8.1	0.01
Number of dressing changes, mean (SD)	12.8 (7.7)	5.45 (2.2)	<0.001
Use of antiseptic, <i>n</i> (%)	44 (74.6)	44 (73.3)	0.99
Use of standard soap with water, <i>n</i> (%)	39 (66.1)	31 (51.7)	0.15
Wound cleaning frequency, <i>n</i> (%)			
Every second day	5 (8.5)	35 (58.3)	<0.001
One daily	30 (50.8)	25 (41.7)	
More than one daily	24 (40.7)	0	
The GP recommended that patient reconsult, <i>n</i> (%)	6 (10.2)	3 (5.0)	0.47
Outcomes, <i>n</i> (%)			
Wound complications	8 (13.6)	6 (10)	0.56
Compliance rate	43 (72.9)	55 (91.7)	0.02

In the Group A, patients received usual verbal instructions concerning the postemergency care and in the Group B received usual verbal instructions and a standardized written advice sheet that detailed postemergency wound care. Values are expressed in *n* (%) or mean (SD). Proportions were compared using the Fisher exact test and mean were compared using the Mann-Whitney test. SD: Standard deviation, *n*: number, GP: General practitioner

of additional advice sheet is associated with higher follow-up compliance.

Prior studies and literature reviews showed that patients can encounter different problems in the 1<sup>st</sup> weeks after they have been discharged from ED, such as emotional problems (uncertainty and anxiety).<sup>[11-15]</sup> For instance, Bull<sup>[11]</sup> explained that patients were given few discharge instructions regarding medication and their condition, and they might experience difficulties with recognizing the signs of complications, managing medications, diet and other aspects of treatment and thus may be at higher risk for complications. Our study showed that an additional advice sheet improved outpatient compliance. The most probable interpretation of this result is that advice sheet allowed clearer explanation to ED patients about managing wound care after stitches or staples. Patients' discharge instructions are easy to apply. Therefore, they felt confident in following the discharge instructions. Other studies showed similar findings. Thomas *et al.*<sup>[16]</sup> and Magnusson *et al.*<sup>[17]</sup> compared the effect of providing ED patients with outpatient appointments and outpatient follow-up compliance. They found that patients who received

detailed instructions (date of appointment and wound care instructions) at the time of ED discharge were significantly more likely to comply with follow-up instructions. Both of these prior studies were consistent with our findings that organizing outpatient care from the ED significantly improves compliance.

Many studies<sup>[18-22]</sup> have investigated the use of telephone follow-up (TFU) to improve outpatient compliance. In our study, this factor has been considered and controlled. Patients that just received verbal discharge instructions (Group A) and those that received additional advice sheet (Group B) have been called at the date of suture removal. The high rate in both Group A and B might be attributable to the use of TFU. However, in a systematic review, Mistiaen and Poot<sup>[23]</sup> investigated the effect of TFU in reducing postdischarge problems. They observed that TFU did not influence the outpatient compliance.

Patients' understanding of their conditions and treatments is strongly related to adherence.<sup>[24]</sup> Studies have demonstrated that patients who understand the principle of the prescription are twice as likely to fill it than those who do not understand the principles.<sup>[25]</sup> Outpatients' adherence

**Table 2: Baseline characteristics of patients compliant and those noncompliant**

	Compliant patient 21/119	Noncompliant patient 98/119	P
Group			
Group A	16 (76.2)	43 (43.9)	0.01
Group B	5 (23.8)	55 (56.1)	
Male, n (%)	15 (71.4)	55 (56.1)	0.29
Age, mean (SD)	48.8 (23.2)	51.2 (25.9)	0.70
Site of injury, n (%)			
Lower extremity	3 (14.3)	12 (12.2)	0.91
Upper extremity	3 (14.3)	15 (15.3)	
Trunk	0	2 (2.0)	
Face	15 (71.4)	69 (70.4)	
Time from injury to wound closure under 6 h, mean (SD)	21 (100.0)	95 (96.9)	0.96
Suture performed by senior physician, n (%)	10 (47.6)	40 (40.8)	0.74
Wound size, mean (SD)	3.82 (3.1)	3.94 (2.2)	0.84
Number of stitches (%)	4.05 (2.0)	4.63 (3.7)	0.95
Initial aspect of wound was clear, n (%)	20 (95.2)	87 (90.6)	0.79
Work-related accident, n (%)	2 (9.5)	12 (12.2)	0.99
Work stoppage prescribed, n (%)	1 (4.8)	8 (8.2)	0.93
Postdischarge wound care			
Average delay to suture removal, mean (SD)	9.14 (4.0)	8.61 (3.3)	0.52
Use of antiseptic, n (%)	16 (76.2)	72 (73.5)	0.99
Use of standard soap with water, n (%)	16 (76.2)	54 (55.1)	0.12
Wound complications, n (%)	17 (85.0)	88 (89.8)	0.81
The GP recommended that patient should reconsult, n (%)	1 (4.8)	8 (8.2)	0.93
Number of dressing changes, mean (SD)	10.42 (8.5)	8.86 (6.3)	0.33

Values are expressed in n (%) or mean (SD). Proportions were compared using the Fisher exact test and mean were compared using the Mann-Whitney test. SD: Standard deviation; n: Number, GP: General practitioner

**Table 3: Multivariable analysis for outpatients' compliance according to discharge instruction with adjustment on the group**

	aOR	95% CI	P
Male	0.24	0.04-1.02	0.06
Age	0.99	0.96-1.02	0.75
Site of injury: Face	0.99	0.14-8.29	0.99
Wound size* <3.82 cm	1.11	0.29-4.21	0.86
Time for suture removal* <6 days	0.57	0.08-2.91	0.53
Use of soap and water	0.86	0.21-3.34	0.83
Group B	4.25	1.22-18.2	0.03

\*Categorized according to the median. aOR: Adjusted odds-ratio, CI: Confident interval

and understanding are associated with the amount and type of information given by health professionals.<sup>[26]</sup> In our study, we did not evaluate in each group the time needed to give and explain discharge instructions to the patient. This time is probably longer for a patient that received both verbal and written discharge instructions (Group B). Therefore, the time factor might be an essential part of greater adhering to discharge instructions in the Group B.

Discharge instructions must be clear to be understood and applied by the patient. Nowadays, recommendations are not very precise concerning wounds' care after discharge from the ED.<sup>[27,28]</sup> In our study, the advice sheet was based on actual recommendations (French

Emergency Medicine Society, 2018). This could explain the absence of any difference regarding dressing application, dressing change frequency, discarding of supplies, and aseptic procedure between the two groups. This recommendation was recently updated and did not change concerning wound care.<sup>[8]</sup>

### Limitations

Due to its nonrandomized study,<sup>[29]</sup> it precludes any causal relationship between hospital discharge process (advice sheet) and outpatients compliance. Despite efforts to control confounders using different analytical strategies, some potential biases may have been disregarded. For example, the use of TFU might induce measurement bias and recall bias. However, TFU has been performed few days after being discharged from ED in order to minimize these types of bias. The design of our study can also be source of limitations. Pre-post studies do not have control over other elements that are also changing at the same time as the intervention is implemented.<sup>[30]</sup> Therefore, changes in outpatients' compliance during the study period cannot be fully attributed to the advice sheet.

### Conclusion

In the management of wound, discharge hospital process provided by health professionals that included verbal

instructions and advice sheet improves significantly the patients' compliance to wound care. To ensure patients' compliance, discharge instructions should be short, simple, and clear.

#### Presentation(s) or awards at a meeting

The results have been presented at the French Emergency Medicine Society Congress (Paris) and at the European Society for Emergency Medicine (Glasgow) in 2018.

#### Author contribution statement

R.C. and T.T. conceived and designed the experiments; R.C. and T.T. performed the experiments; R.C. analyzed and interpreted the data; R.C. and T.T. contributed reagents, materials, analysis tools or data; R.C., T.T., A-L.F-P, and P.J. wrote the paper and review the article.

#### Conflicts of interest

None Declared.

#### Ethical approval and consent to participate

AP-HP Research Ethics Review Committee approved the investigation and with waiver of informed consent (IRB00011591, 10 January 2019).

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## Appendixes

### Appendix 1: Written discharge instructions

#### *Discharge instructions for wound care*

Taking proper care of your wound will help it heal. This sheet will help you remember wound care when you are at home.

#### *Dressing the wound – every 2 days*

- Keep the wound **clean and dry**.
- How to **remove the old dressing**:
  - Put on disposable gloves if you're dressing a wound for someone else or if your wound is infected
  - Pull gently toward the wound to loosen the tape
  - One layer at a time, gently remove the dressing. You can use some water to help you
  - Look at the dressing. Make sure that you are seeing a decreasing amount of blood, and that the blood is turning into a clear, amber fluid
  - If your wound has stitches, look for loose ones
  - Put the dressing in a plastic bag. Then remove your gloves.
- **Inspect the wound.** Look for signs that it isn't healing normally. A wound that isn't healing properly may be dark in color or have white streaks.
- **Dress the wound:**
  - Wash your hands again
  - Clean and dress the wound with **soap and water**
  - If you're dressing a wound for someone else or if your wound is infected, put on a new pair of disposable gloves.
- Discard any used materials or trash in a sealed plastic bag before placing in a trash can.

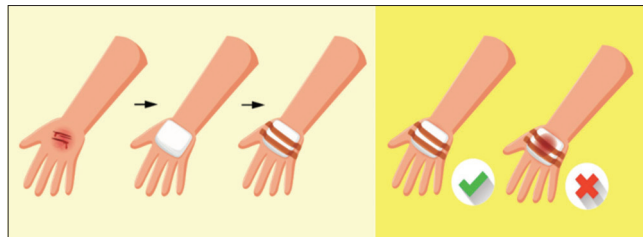
#### Follow Up

- If sutures or staples are in place, it is important to keep your appointment with your general practitioner for removal. If they are left in place too long permanent marks may remain
- If Steri-Strips were applied, they will usually fall off by themselves after 10–12 days.

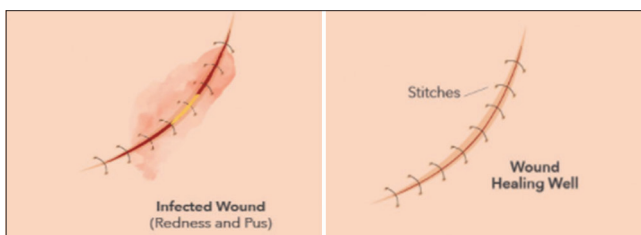
#### Call us (emergency direct line + XX XX XX XX XX) right away if you notice:

- Increased drainage or bleeding from the wound
- Redness in or around the wound
- Foul odor or pus coming from the wound
- Fever above 101.0°F or shaking chills.

#### How do you monitor the wound?



Watch for signs of infection?



Appendix 2: Standardized questionnaire based on the Bates-Jensen Wound assessment to evaluate the compliance for discharge instructions

Question		points
Size	smaller	1
	stable	2
	larger	3
Edges	unable to clearly distinguish wound outline.	1
	wound is deeper than edge.	2
	tissue formation around wound & at edges	3
Necrotic Tissue Type	skin surface is white or gray	1
	thick, stringy, clumps of debris; attached to wound tissue	2
	crusty tissue; strongly attached to wound base	3
Exudate Type	thin, bright red	1
	thin, watery, clear	2
	thick, opaque yellow to green with offensive odor	3
Exudate Amount	wound tissues dry	1
	wound tissues wet; moisture evenly distributed in wound	2
	wound tissues bathed in fluid; drainage freely expressed; may or may not be evenly distributed in wound	3
Skin Color Surrounding Wound	Pink or normal for ethnic group	1
	White or grey pallor	2
	Dark red, purple or black	3
Peripheral Tissue Edema	No swelling or edema	1
	Non-pitting edema	2
	Crepitus and/or pitting edema	3
Peripheral Tissue Induration	None present	1
	Induration in some area around wound	2
	Induration in any area around wound	3
<b>Wound status continuum</b>		
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48		
<b>Tissue health</b>	<b>Wound regeneration</b>	<b>Wound degeneration</b>