TEACHING OF TECHNICAL GESTURES TO MEDICAL STUDENTS: IS SIMULATION A GREAT HELP?

Mémoire présenté le 11 octobre 2013
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Préambule

Nous avons souhaité rédiger ce travail en anglais même si le nombre d'étudiants inclus est trop faible et la méthodologie à améliorer pour une éventuelle publication. Nous souhaitons poursuivre notre étude afin d'atteindre un seuil de significativité statistique et ainsi d'infirmer ou confirmer les conclusions préliminaires que nous avons tirées. Les annexes 1 et 2 n'ont pas été traduites en anglais car elles ne peuvent figurer dans une publication. Les annexes 3, 4 et 5 ont été traduites car publiables.
Abstract

**Aim:** to evaluate simulation as part of a teaching process of urethral catheterization (UC) and thoracentesis procedure (TP) for medical students.

**Methods:** A classic first lesson was given for all students, with the distribution of a detailed technical report explaining how UC and TP have to be performed. They were then divided into two groups: one group with a simulation teaching, one group without. The assessment was performed on a mannequin or a dedicated simulator kit with an assessment grid, 2 months and 1 week after the simulation teaching for UC and TP, respectively. Students were also given an evaluation form to assess their feelings about the simulation method at the end of the evaluation step.

**Results:** The assessment of UC and TP revealed better skills for students participating in the simulation teaching process, whereas the other students’ overall proficiency was less accurate. 5 out of 6 students judged the theoretical lesson and the technical report formative for the UC and the TP. They all thought the simulation workshop could improve their professional practice. Although they considered that it should be pursued, the teaching at the bedside has equally to be done, as both teaching methods appeared complementary.

**Conclusion:** Our study shows a tendency that simulation added to classical lecture improve the teaching of technical gestures. These very preliminary results have to be confirmed in a further study.
1. Introduction

In 1999, the Institute of Medicine Report "to err is human" [Kohn 2000] stated that medical errors were the eighth cause of death among patients and that 44000 to 98000 deaths per year were related to health care. The incidence of serious adverse effects occurs mainly in the surgical field or intensive care unit. However, the zero risk does not exist, making it mandatory to reduce the risk to a minimum.

Although a recent review of literature stated that simulator-based medical education with deliberate practice is superior to traditional clinical medical education in achieving specific clinical skill acquisition goals [McGaghie 2011], a recent communication at the French Pediatric Surgery Congress [Eyssartier SFCP 2013] showed that simulation is not widely used as a teaching method. Among 128 students who were asked by mail, only 48 (37.5%) answered: 27 students had learned some technical gestures by simulation, of whom five spent more than 10 hours and 4 over 20 hours. Twenty-one people had learned by more elaborate simulation, three of whom spent more than 10 hours and one more than 20 hours. Indeed, less than 15% of the responders have not even once participated in a high fidelity simulation scenario.

During their medical studies students in the 4th to 6th years attend practical professional activity every morning at the hospital and are asked to learn several medico surgical procedures. Urethral catheterization (UC) is of frequent prescription in surgical and intensive care units, which makes it a core skill for any physician. However, the procedure can lead to adverse effects such as false passage, stricture, stenosis, hematuria, paraphimosis or infection, especially in the hands of interns during their first six months of internship [Thomas 2009]. Considering that it could be too late to learn such skills practised by nurses in the internship, we intended to teach medical students so that they will be prepared for their internship. Thoracentesis procedure (TP)
especially for the diagnosis of pleural effusion is frequent in our ward or ICU. This procedure can lead to side effects such as hemothorax pneumothorax, infection of the skin. Assessment of educational program for TP is now of major interest to improve the skills of our medical student [Jiang 2011].

The goal of our study was to test the usefulness of simulation in the medical teaching of UC and TP.

2. Material and methods

Study population

Medical students in two of our hospital departments were enrolled in the study: five from the paediatric intensive care unit and five from the paediatric surgery unit. They were told that their participation in this exercise would have no impact on their course grade and that any data collected would not be part of their formal course records.

Teaching method for the UC

A classic first lesson was given to all the students, explaining in detail how UC has to be performed. The power-point presentation was as clear as possible with only two photos, one showing the material needed and one showing the catheterization of a man. No video was shown so as not to interfere with the simulation teaching. During the lesson, a detailed technical report (annexe 1) was distributed to each student so that they were able to carefully follow the presentation and keep it as key rules for their future practice.

Teaching method for the TP

A classic lesson was done as for UC. No photos were shown during the TP course. A detailed technical report was given to all the students after the lecture (Annexe 2).
We then divided the students into two groups: one group with a simulation teaching, (S+) one group without (S-). For the UC, they were given a number they would have to remember for the evaluation day so that the examiner would not know which group the student belonged to. The repartition between the two groups was equally done regarding their presence or absence due to the summer holidays. For the TP, the blindness could not proceed because the time between the course and the evaluation was only one week.

All the students were told to remember how many catheterizations or TP they would see and how many they would perform alone or with help (nurse, resident, senior) between the time of the lesson and the assessment process.

**Simulation sessions**

The simulation was organised one week after the lesson for UC and the same day as the lesson for TP. For the UC, each student did the entire procedure first on a female model and only the technical gesture of catheterization on a male model. For the TP, the student did the entire procedure on a kit that allowed the palpation of the skin, the rib and obtaining liquid if the procedure was correctly made.

**Assessment of the students**

*For the UC procedure*

Students were asked the number they had been initially given, the number of UC they had seen and the number of UC they had already performed alone or accompanied since the lesson. They were also asked how many UC they had seen or performed before their participation in the study.

The assessment was performed on a male mannequin, ideally by another person than
the simulation teacher. An assessment grid (annexe 3) was previously prepared including nine tested items with four possible answers: non-acceptable, acceptable, good, and excellent. The grid had been built based on a modified objective structured clinical examination checklist already published by Todsen et al [Todsen 2013]. At the end of the evaluation, a debriefing was individually made for each student. They were also given an evaluation form (annexe 5) to assess their feelings about the simulation method. They could classify the overall performance of each step into four categories: absolutely non-formative, non-formative, formative and very formative. They were also asked six other questions related to the usefulness and efficiency of simulation.

For the TP

They were asked how many TP they had seen or performed before their participation in the study.

The same simulation teacher performed the assessment on TP procedure kit. An assessment grid (annexe 4) was previously prepared including 9 tested items with four possible answers: non-acceptable, acceptable, good, and excellent. We did not find any grid of that form in the literature and build one based on recommendations of good practice [Thomsen 2006]. At the end of the evaluation, a debriefing was individually made for each student.

3. Results

1. Comparison of the two groups S+/S-

For the UC procedure (cf table 1)

Among the 10 medical students enrolled between the fourth and fifth years of medical
school, all followed the classic lesson but only six were finally evaluated on the simulator for UC.

The assessment revealed better skills for students participating in the simulation teaching process, even if some steps were completely forgotten (for example, two students forgot to fix the catheter, one forgot to put a sterile drape on the patient). On the other hand, the three other students forgot did not forget step but the quality of each step was less accurate.

Students reported seeing a mean of 1.6 UC (0-5) between the lesson and the assessment, but not having done only once. Prior to the study, students had seen a mean of 2.6 (0-10) UC and performed a mean of 3 (0-10) UC. In the simulation group, two students had seen more UC before the study than the whole group but the only student who had seen only one UC and who had never performed one, succeeded better than students of the non-simulation group. In parallel, the student belonging to the non-simulation group who had performed UC before the study scored worse than all the students of the simulation group.

For the TP procedure (cf table 2)

Among the 10 medical students enrolled between the fourth and fifth years of medical school, 6 followed the classic lesson and 3 had the simulation session after the course. One week after the course, we finally evaluated 8 students on the simulator for TP. The S+ had 3 students; the S- group had 5 students.

Interestingly, no differences between the two groups were shown for the items evaluating the theory (indication, search for contra indication, information on the patient chest X-ray after the TP). Practical skills such as disinfection, puncture with maintaining the aspiration and checking the puncture zone were evaluated with a level
of competence from good to excellent whatever the group S- or S+ (table 2). The assessment found 5 evaluations unacceptable: 4 were from the S- group, one from the S+ group.

No students were reported seeing or participating in a TP between the lesson and the assessment.

2. Evaluation of the teaching method by the students

For the UC procedure

Students have to evaluate the theoretical lesson, the technical report and the simulation workshop. For the UC, 5 out of 6 students judged the theoretical lesson and the technical report formative. One student found the theoretical lesson non-formative whereas one student found the technical report very formative. Four students evaluated the simulation session as very formative, 2 as formative.

They all thought the simulation workshop could improve their professional practice and they agreed that it should be pursued. They did not want longer sessions and 2/3 of them thought simulation sessions should be mandatory. Nevertheless, five students thought that teaching at the bedside should not be abandoned and should be done in parallel, as both teaching methods are complementary. One student felt destabilized by the relation with the mannequin. They suggest that this type of teaching should be performed early on in their curriculum (second or third year of medical school).

For the TP procedure

8 Students had to evaluate the theoretical lesson, the technical report and the simulation workshop. The theoretical lesson was found formative for 5, non-formative for 1. The technical report was judged formative in 5/8. They all thought the simulation workshop
could improve their professional practice and they all agreed that it should be pursued. One student thought that teaching at the bedside should not be abandoned and should be done in parallel, as both teaching methods are complementary. One suggested that this type of teaching should be performed early on in their curriculum (second or third year of medical school).

4. Discussion

The preliminary results of our study evaluating the simulation teaching process of two common technical gestures showed that fourth-year medical students involved in the simulation group scored better than students not having had simulation teaching. For the UC procedure, the S+ group had excellent practical procedure whereas this was not the case for the TP procedure. In this late procedure, the majority of unacceptable achievements were found in the S- group. But interestingly, the theoretical and communication aspects were not altered if the student was not in the S+ group.

However, our study included a lot of bias. First, the number of students was very small, rendering non informative and impossible any statistical analysis. This was partly due to the summer holiday period when our study was conducted and partly because our study began later than expected. Indeed, our first idea was to teach ascites puncture but no mannequin was available. Furthermore, no randomisation was possible even if we had wished a randomisation following the website http://www.random.org but the study period was too short with medical students present in the units only from the end of June to the end of September. This will be our next step in the on-going study.

The second pitfall concerned the examiner, who was the same as the teacher. Even if the students were given an anonymous number at the first theoretical lesson, there were
not so many of them and it was easy to remember all ten, which can lead to a lack of objectivity in the assessment. The question of anonymity was not possible for the TP group.

However, the originality of the study relies on the comparison of two groups of students whose difference was only the simulation teaching. Such a study has never been carried out. Todsen recently published a UC simulation based study enrolling 76 third-year medical students. As students were invited by email to participate to the study, we may wonder if not only the most motivated students answered, introducing a bias in the selection process. All students were taught UC by simulation. At 1 and 6 weeks, they were randomised on watching an educational video just prior to evaluating their skills on a real patient. Even if the authors concluded that simulated UC training should be the standard for all medical school curricula, no significant difference was noticed between the two groups and the design of their study did not allow them to draw such a conclusion [Todsen 2013]. Only well-conducted randomised studies whose only different variable would be simulation teaching could really conclude as to the efficiency of the simulation teaching, as we intended to do. Nevertheless, studies with historical control groups have already shown that simulation-based medical education is of great value in reducing catheter-related bloodstream infections, [Barsuk 2009] in improving post-partum outcome (ie, brachial palsy injuries [Draycott 2008] and neonatal hypoxic-ischemic encephalopathy [Draycott 2006]). Furthermore, simulation allowed better proficiency and increased self-rated comfort when tested on 204 third-year medical students [Naylor 2009]. The teaching of hand-hygiene principles and aseptic techniques in UC also showed higher technical proficiency and maintained better sterility [Mittal 2011]. Finally, the learners themselves enhance the use of simulation as it allows learning technical skills for 94% of them, refining technical skills for 84%, and acquiring
procedural teaching skills for 84% [Shanks 2010]. As in our study, it should be done early in residency and instructors have an important role in the demonstration of the technique (92%), the observance of learner techniques (92%), the teaching of evidence behind procedural steps (84%) and the feedback provision (89%) [Shanks 2010].

Conclusion

Although not perfectly designed and performed, our study shows a tendency to better technical gestures, concerning UC and TP teaching when based on simulation. These very preliminary results are to be confirmed in a further study. Other medico-surgical procedures must be included in that simulation programme such as ascitis puncture and arterial gas puncture.
Bibliography


Table 1 Results of the level of performance of the students (n=6) during the evaluation on a simulation mannequin for the UC.

<table>
<thead>
<tr>
<th></th>
<th>Non acceptable</th>
<th>Acceptable</th>
<th>Good</th>
<th>Excellent</th>
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<tr>
<td></td>
<td>S-</td>
<td>S+</td>
<td>S-</td>
<td>S+</td>
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<td>Indication check</td>
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<td>1</td>
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<td>Check the equipment and</td>
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<td>its use planning</td>
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<tr>
<td>Choose the appropriate</td>
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<td></td>
<td>1</td>
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<td>patient’s age</td>
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<tr>
<td>Aseptic technique at</td>
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<td>each stage</td>
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<td>1</td>
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<td>the correct value and</td>
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<td>with sterile water</td>
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<td>Check the correct</td>
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<td>1</td>
<td></td>
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Table 2 Evaluation of the assessment of students (n=8) during the evaluation of the TP on the simulator.

<table>
<thead>
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<th>Action</th>
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<th>Good</th>
<th>Excellent</th>
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<td></td>
<td>S+</td>
<td>S-</td>
<td>S+</td>
<td>S-</td>
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<td>Check the puncture area</td>
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<tr>
<td>Explain the procedure to the patient</td>
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<tr>
<td>Looking for contraindication</td>
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<td></td>
<td></td>
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<tr>
<td>Use a rigourous asepsia</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintain an aspiration for the puncture</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Using a proper bandage</td>
<td></td>
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<td>Prescription of a post puncture chest X-ray</td>
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<td>Adequate monitoring of the patient post puncture</td>
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Annexe 1

**FICHE TECHNIQUE**  
**LE SONDAGE VESICAL**

**Indications**  
**Diagnostiques**  
- Recueil d’échantillon d’urines stériles pour analyse bactériologique  
- Surveillance des entrées et des sorties dans les services de soins intensifs  
- Cystographie rétrograde  

**Thérapeutiques**  
- Intervention sur le petit bassin  
- Rétention urinaire et prévention des rétentions urinaires  
- Administration médicamenteuse  

**Contre-indications**  
- Absolue : Suspicion de rupture traumatique de l’urètre (fracture du bassin, traumatisme pelvien)  
- Relatives : malformation du bas appareil urinaire, plastie urétrale ou vésicale, allergie au latex  

**Matériel**  
- **Sonde** :  
  - Calibre en principe : de charrière 6 à 18 selon l’âge  
  - Sondage à demeure : sonde de Foley munie d’un ballonnet  
    - Sonde de Foley en latex : inférieur à 1 semaine  
    - Sonde de Foley en latex enduit : silicone, hydrogel, polyuréthane : inférieur à 3 semaines  
    - Sonde de Foley en silicone : inférieur à 5 semaines  
  - Sondage intermittent : sonde droite ou béquillée type Nélaton sans ballonnet  

**Nécessaire pour la toilette génitale hygiénique** :  
- Savon doux, gant de toilette, serviette  
- Gants non stériles à usage unique  
- Plat-bassin (chez la femme)  
- Alaise en tissu  

**Nécessaire pour la toilette génitale antiseptique** :  
- Antiseptique : Halogénés chlorés (Dakin®), Polyvidone iodé (Bétadine® gynécologique), Chlorhexidine acqueuse  
- Compresses stériles.  
- Gants stériles
Autre matériel :
  - Gants stériles
  - Seringue de 10 ml
  - Ampoule d'eau stérile : jamais de sérum physiologique
  - Champ de table stérile
  - Champ fendu stérile
  - Lubrifiant hydrosoluble
  - Poche collectrice d'urine vidangeable équipée d'une valve antireflux
  - Support de sac pour la poche
  - Nécessaire à l'hygiène des mains

PROCEDURE

Préparation
  - Vérifier l'indication
  - Prévenir le (la) patient(e) : expliquer l'anatomie, la nature du geste, les bénéfices, les risques et les complications
  - Installer le matériel après vérification des dates de péremption et de l'intégrité des emballages
  - S'installer à gauche de le (la) patient(e) si l'on est droitier et à droite si l'on est gaucher

Toilette génitale hygiénique
  - Installer le (la) patient(e) confortablement, sur le plat-bassin chez la femme
  - Effectuer un lavage simple des mains
  - Mettre les gants non stériles
  - Savonner les cuisses puis les organes génitaux de l'extérieur vers l'intérieur et de haut en bas
  - Rincer en procédant de la même façon
  - Essuyer en tamponnant, sans frotter

antiseptique
  - Effectuer un lavage antiseptique des mains
  - Mettre les gants stériles
  - Effectuer la toilette génitale antiseptique avec les compresses stériles imbibées d'antiseptique en allant d'avant en arrière et utiliser une compresse par passage

Installation et préparation du matériel de sondage
  - Installer le champ stérile de table et déposer le matériel stérile sur le champ stérile de table
  - Effectuer un lavage antiseptique des mains
  - Mettre les gants stériles
  - Remplir la seringue avec de l'eau stérile
  - Faire le montage du système clos : sonde et poche collectrice. Mettre un Tégaderm® à la jonction des 2 pour éviter toute ouverture lors d'une traction involontaire.
  - Verser le lubrifiant sur une compresse stérile
  - Lubrifier la sonde urinaire
Introduction de la sonde urinaire

1. Chez la femme
   - Installer le champ fendu stérile : centrer la fente du champ sur la vulve.
   - Écarter les lèvres de la main non dominante. Saisir la sonde avec la main dominante en "cor de chasse" : faire une boucle en l'air afin d'éviter tout contact avec une surface non stérile.
   - Introduire la sonde par le méat urinaire dans l'urètre et la pousser en l'orientant tout droit.
   - Poursuivre l'introduction, un écoulement d'urine dans la tubulure de la poche collectrice atteste de la bonne position de la sonde en intra-vésical.
   - Si sonde de Foley, gonfler le ballonnet de la sonde avec la seringue d'eau stérile 3 à 10 ml.
   - Tirer légèrement sur la sonde pour vérifier que la sonde ne sort pas.

2. Chez l'homme
   - Installer le champ fendu stérile sur les cuisses et recouvrir le scrotum.
   - Saisir la sonde avec la main dominante en "cor de chasse".
   - Saisir la verge avec la main non dominante en maintenant une traction légère et la tenir en position verticale pour faire "disparaître" la courbure antérieure.
   - Introduire la sonde par le méat urinaire dans l'urètre jusqu'à la butée. Au besoin, instiller dans l'urètre du gel lubrifiant pour faciliter l'introduction de la sonde.
   - Lorsque l'on bute, abaisser la verge à l'horizontale pour terminer l'introduction de la sonde, c'est le passage de la deuxième courbure de l'urètre.
   - Poursuivre l'introduction, un écoulement d'urine atteste de la bonne position de la sonde.
   - Si sonde de Foley, gonfler le ballonnet de la sonde avec la seringue d'eau stérile 5 à 10 ml.
   - Tirer légèrement sur la sonde pour vérifier que la sonde ne descend pas.
   - Recalotter le gland pour éviter un œdème et le risque de paraphimosis.

Fixation de la sonde et fin du sondage
   - Fixer la sonde sur la cuisse chez la jeune fille ou sur le ventre chez le garçon : mettre un Duoderm® sur la peau puis fixer la jonction entre la sonde et la poche collectrice à l'aide d'un Tégaderm®
   - Accrocher le sac collecteur en déclive.

Complications :
Elles sont rares : hématurie, fistule par perforation urétrale, paraphimosis, infections iatrogènes (conditions d'asepsie non adéquate), sténose de l'urètre.
Annexe 2

FICHE TECHNIQUE
LA PONCTION PLEURALE

I/ Définition
Acte médico-chirurgical qui consiste à introduire une aiguille dans l'espace pleural du patient dans une position en rapport avec sa pathologie ou son handicap

II/ Contre-indication
Troubles de l'hémostase

III/ Les buts
La ponction pleurale peut-être :

1. Exploratrice

Elle permet de dépister ou confirmer un épanchement pleural en précisant :
  - la nature du liquide pleural
    - liquide clair jaune citrin
    - liquide hématique (sanglant ou rosé)
    - liquide chyleux (lymphatique)

Elle permet de réaliser :

Une étude bactériologique (recherche de germes pyogènes)

Une étude chimique :
  dosage du glucose et des protéines

Distinguer :
  - un transsudat = taux de protéines < 30 g/l
  - un exsudat = taux de protéines > 60 g/l (c'est un liquide inflammatoire)

Une étude cytologique : une numération des éléments du liquide pleural (hématies, leucocytes, recherche, de cellules tumorales, ...)

2. Evacuatrice

Elle est réalisée lorsqu'un épanchement est trop important et entraîne une gêne respiratoire.

3. Thérapeutique

injection d'un produit médicamenteux : ATB spécifique, cytostatique en cas de cancer, ...
lavage de la cavité pleurale
IV/ Procédures

**Avant la ponction**

informer la personne, la rassurer :

Repérage de la zone de ponction

Percussion

Échographique

- la ponction pleurale se réalise au lit du malade
- peut se faire sous anesthésie locale
- éviter de bouger, tousser pendant la ponction
- demander si allergie à la Xylocaïne (choc anaphylactique)

préparer le dossier :

- résultats NF, crase sanguine
- arrêt des anticoagulants sur PM
- vérifier la radio thoracique

Mise en place d’un scope qui permet une surveillance continue pendant le geste de la Fc, la SpO2, FR

Vêtir la personne soignée d'une chemise fendue demander d'aller uriner prendre les différents paramètres (T°C, pulsations, FR, ...)

**b) Au cours de la ponction**

La ponction se réalise au ras du bord supérieur de la côte ; le paquet vasculo-nerveux passe contre le bord inférieur de la côte

**Installation du patient :**

la ponction se réalise

assis au bord du lit (épaules légèrement en avant et dos rond)

assis à califourchon sur une chaise

dans son lit en décubitus latéral et le bras sur-élevé au-dessus de la tête

**Déroulement :**

➢ l'habillage du médecin :

surblouse / masque / gants stériles/ calot ➢ préparation cutanée : rasage éventuel de l'aisselle ou du thorax /

désinfection cutanée selon le protocole

➢ +/- anesthésie locale : souvent c'est de la Xylocaïne 1% nonadrénaliniédans une seringue de 10 mL ; on adapte une aiguille à intra-musculaire ; l’aiguille est enfoncée en aspirant pour éviter un pneumothorax

**la ponction :**
- si elle est exploratrice seule, seringue de 50 mL / 20 ml avec du serum physiologique
- avec une aiguille de Küss ou
- une aiguille à PL (avec mandrin)
- si elle est exploratrice et évacuatrice, Vous enfoncez l'aiguille dans la plèvre, désadaptez la seringue, utilisez une tubulure de perfusion (sans le comptegouttes) qui sera relié à un bocal (type Redon sans vide) ; le simple fait d'être en déclive (= bocal par terre) va permettre au liquide de s'écouler ; au moment où vous désadaptez seringue et aiguille, le patient doit rester en apnée pour éviter un pneumothorax.

- si ponction évacuatrice avec lavage de la cavité pleurale au cours des pleurésies purulentes ;
- elle se réalise soit
  - un trocart de Küss et
  - une seringue de Tournant /
- soit avec une seringue de 50 mL et une tubulure à 3 voies = 1 voie avec la tubulure reliée à un bocal de type Redon, 1 voie avec une tubulure plongeant dans un bocal de chlorure de sodium isotonique à 9% tiédit à 37°C (afin d'éviter un décalage thermique et un risque d'infection respiratoire),

C) Surveillance clinique de la personne soignée au cours de la ponction pleurale
Demander au patient si il présente des douleurs si il est confortablement installé, expliquez ce que vous êtes en train de faire
Les complications possibles =

- Risque de malaise vagal :
signes : sueurs, tachycardie, vertige, pâleur, +/- hypoTA, malaise général observer le faciès du patient, prendre les pulsations et la température arrêt de la ponction

- Risque de pneumothorax :
douleurs thoraciques importantes à type de point de côté, toux quinteuse / sèche, dyspnée / polypnée, cyanose des muqueuses labiales et des ongles (= signes respiratoire spécifique)
radio pulmonaire prévue systématiquement après la ponction pour voir si pneumothorax

Risque de choc anaphylactique à la Xylocaïne :
signes généraux : pâleur, anxiété, hypoTA, tachycardie, sueurs
- Risque hémorragique
signe : écoulement pleural hématique surveillance de la TA si beaucoup de sang : arrêt de la ponction
signes : malaise général, hypoTA, tachycardie rush cutané, prurit, fourmillements si surdosage à la Xylocaïne : fourmillements péri- buccal :
- Risque d'OAP, risque d'oedème a vaguo : oedème a vaguo quand le débit de la ponction est trop important / trop rapide, entraînant une expansion pulmonaire trop
rapide d'où un appel d'eau des capillaires vers les alvéoles pulmonaires
– signes : toux quinteuse avec expectorations rosées, mousseuses

➔ Risque d'atteinte locale : – lorsque l'aiguille pique dans le paquet vasculo-nerveux – signes : douleurs importantes, baisse de la sensibilité au niveau local

➔ Risque infectieux :
– pleural = fièvre dans les jours suivants la ponction, douleurs thoracique – la paroi thoracique = écoulement purulent, douleur, rougeur local

Surveillance post procedure
prévoir une radio pulmonaire dans la journée surveillance du patient : toutes les demi heure pendant les 3 premières heures (pulsations, T°C, respiration, faciès, état général)
Annexe 3

Assessment grid
Urethral catheterization (UC)

Date :

N° of the student :
Year in medical school:

Simulation group : yes -no

Nb of UC seen since and before the classic lesson:
Nb of UC done since and before the classic lesson:
  • With help :
  • Alone :

<table>
<thead>
<tr>
<th></th>
<th>Non acceptable</th>
<th>Acceptable</th>
<th>Good</th>
<th>Excellent</th>
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<tbody>
<tr>
<td>Indication check</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Check the equipment and its use</td>
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<tr>
<td>planning</td>
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<tr>
<td>Choose the appropriate probe</td>
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<tr>
<td>according to the patient’s age</td>
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<tr>
<td>Aseptic technique at each stage</td>
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<tr>
<td>Proper technique according to sex</td>
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<tr>
<td>mannequin</td>
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<tr>
<td>Inflate the balloon to the correct</td>
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<tr>
<td>value and with sterile water</td>
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<tr>
<td>Check the correct position of the</td>
<td></td>
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<tr>
<td>catheter</td>
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<td>Has done a closed catheterization</td>
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<tr>
<td>Adequate fixation of the catheter</td>
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Annexe 4

Assessment grid
Thoracentesis procedure (TP)

Date:

N° of the student:
Year in medical school:

Simulation group: yes - no

Nb of TP seen since and before the classic lesson:
Nb of TP done since and before the classic lesson:
  - With help:
  - Alone:

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<tr>
<td>Check the puncture area</td>
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<tr>
<td>Explain the procedure to the patient</td>
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<td>Looking for contraindication</td>
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<tr>
<td>Use a rigorous asepsia</td>
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<tr>
<td>Maintain an aspiration for the puncture</td>
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<td>Using a proper bandage</td>
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<tr>
<td>Prescription of a post puncture chest X-ray</td>
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<td>Adequate monitoring of the patient post puncture</td>
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Annexe 5

Simulation teaching assessment by the students UC and TP

Date :

How do you consider:

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<td>The technical report</td>
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<tr>
<td>The simulation process</td>
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If you have participated to the simulation group:

Do you think simulation can improve your professional practice ?
Not at all -------------------------- Enormously

Do you think we should go on with simulation teaching ?
o yes o no

Would you like to have longer simulation teaching time ?
o yes o no

Do you think simulation must become mandatory ?
o yes o no

Do you think we should privilege bedside teaching ?
o yes o no

Do you think we should privilege simulation teaching ?
o yes o no

Other(s) suggestion(s) :