

Medical evacuation from abroad of critically ill patients

A case report and ethical issues

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Abstract

Rationale: Patients repatriated from foreign hospitals are sources of extensively drug-resistant (XDR) bacteria outbreaks. Thus, an individual benefit potential for the patient opposes a collective ecological risk potential. These ethical issues have not been well studied.

Patient concerns: We report the case of a 74-year-old patient repatriated from Mauritius to the French island of Reunion who presented mesenteric infarction evolving over several days, and who suffered a cardiac arrest before transfer.

Diagnoses: In Reunion Island, a CT-scan revealed a multisegmental enlarged parietal enlargement associated with free peritoneal effusion and a suboccluded aspect of the superior mesenteric artery.

Interventions: Surgical exploration showed a severe mesenteric infarction with peritonitis, and a resection of 120cm of the small intestine was conducted. This patient was infected with a vanA glycopeptide-resistant *Enterococcus faecium* and a carbapenem-resistant *Klebsiella pneumoniae* which produced carbapenemases NDM-1 and OXA-181, which required specific care and could have led to a local epidemic.

Outcomes: The patient died after 9 days after being admitted to the ICU.

Lessons: Repatriation of critically ill patients from abroad should be considered according to ethical criteria, evaluating, if possible, the expected benefits, and ecological risks incurred. Limiting unnecessary transfers could be an effective measure to limit the spread of XDR bacteria.

Abbreviations: CT-scan = computed tomography-scan, ICU = intensive care unit, MDR = multidrug resistant, MIC = minimum inhibitory concentration, XDR = extensively drug-resistant.

Keywords: ethics, hospital environment, infectious control, multidrug resistance, travel

1. Introduction

A frequent source of extensively drug-resistant (XDR) bacteria's hospital outbreaks is patients repatriated from a hospital from abroad.^[1] The potential benefit of this repatriation is therefore opposed to an ecological and collective risk. This opposition must be analyzed according to ethical considerations. To our knowledge, no article has been published on these issues. Only

an article on this has been published on ethical implications of evacuating catastrophically injured individuals from operational theaters of war.^[2] A reflection on this subject could be useful for a better management of critically ill patients repatriated. We present the case of a patient repatriated from a hospital in a foreign country, who was infected with 2 strains of XDR bacteria and whose care was futile.

The patient being deceased, the informed consent for this publication was given by his wife. The ethics committee was not necessary in view of the methodology used.

2. Case presentation

We report the case of a 74-year-old French male patient with a history of hypertension, dyslipidemia, and severe peripheral arterial disease treated with a left iliac stent. The patient lived in metropolitan France with his wife, but regularly went to Mauritius for family reasons. In 2017, after a 2-month stay in Mauritius, he presented abdominal pain with diarrhea and vomiting. After a few days of hospitalization, an electrocardiogram revealed atrial fibrillation and a first computed tomography (CT) scan showed diffuse intestinal pneumatosis. Surgery was not proposed to the patient; instead, he was treated with antibiotics (ceftriaxone, metronidazole, and clindamycin). The next day, the patient presented a cardiac arrest (no-flow and low-flow times unknown) from which he recovered. Antibiotics were then switched to piperacillin/tazobactam, amikacin, and vancomycin.

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The patient neither improved nor worsened. In view of this, he was aeromedically evacuated to Reunion Island, a French island in the Indian Ocean, 7 days after the first CT-scan and 6 days after the cardiac arrest.

On arrival in our intensive care unit (ICU), the patient presented febrile shock needing norepinephrine, mechanical ventilation, and renal replacement therapy. He also had multiple and severe pressure ulcers. A body CT-scan revealed an absence of cephalic abnormality, a centro-lobular emphysema, a multi-segmental enlarged parietal enlargement associated with free peritoneal effusion in the process of partitioning, a significant hepatic dimorphism with left necrosis of left liver, a suboccluded aspect of the superior mesenteric artery, and a significant atheromatous aorto-iliac overload (Fig. 1A).

Surgical exploration was rapidly decided during a multidisciplinary staff meeting. Severe mesenteric infarction with peritonitis was found, and a resection of 120 cm of the small intestine was conducted (Fig. 1B). The preoperative peritoneal samples revealed 2 emerging XDR bacteria: vanA glycopeptide-resistant *Enterococcus faecium* and carbapenem-resistant *Klebsiella pneumoniae* which produced carbapenemases NDM-1 and OXA-181 (a variant of OXA-48 enzyme). The 2 XDR bacteria had already been detected on the rectal swab taken on ICU admission, as had multidrug resistant (MDR) *Citrobacter freundii* (extended-spectrum β -lactamases production). Antibiotics susceptibility testing showed that the *K pneumoniae* strain was susceptible to trimethoprim/sulfamethoxazole (minimum inhibitory concentration (MIC) =0.064 mg/L), tigecycline (MIC =0.38 mg/L), and colistin (MIC=0.5 mg/L), and presented rather slow MICs to imipenem (MIC=4 mg/L, intermediate categorization) and meropenem (MIC=6 mg/L, intermediate categorization). The *E faecium* isolate was shown to be susceptible to linezolid (MIC=2 mg/L), daptomycin (MIC=2 mg/L), and tigecycline (MIC=0.032 mg/L).

After surgery, antibiotics were switched to tritherapy with meropenem, colistin, and tigecycline. Finally, the patient developed postanoxic encephalopathy and died 9 days after being admitted to the ICU.

3. Discussion

While this case may seem unexceptional, it raises several important questions. Ethical issues surrounding the patient's

medical evacuation and the care he received in our ICU can be discussed in light of the 4 fundamental ethical principles: respect for autonomy, nonmaleficence, beneficence, and distributive justice.^[3]

Respect for autonomy implies that individuals should be self-determining and should be respected for their ability to determine their own course.^[4] In the case presented here, the patient was sedated, which means that he could not be informed of his condition and could not determine his own course. Respect for autonomy was therefore impossible.

The principles of nonmaleficence and beneficence imply, respectively, that one ought not to inflict evil or harm and that one ought to do or promote good.^[5] The question of respect for these principles was highly debatable in our case. Indeed, the patient's condition was severe from the outset, and both multimorbidity and therapeutic delay reduced the chances of survival. It is likely that this patient would have received care much earlier if he had been in France.

Finally, the principle of distributive justice is clearly an issue here. Given that the patient was infected with XDR bacteria, his repatriation and stay in our hospital exposed the local population to major ecological risk.^[3] The spread of XDR bacteria could have compromised the survival of other hospital patients and/or led to an epidemic that would have forced us to close the ICU—a situation that has been described elsewhere.^[1] This would have had dramatic consequences considering that there are only 2 ICUs on Reunion Island for a population of about 900,000.

The medico-technical and financial resources invested in our hospital (systematic screening strategy in ICU for repatriated patients) allowed for early detection of XDR carriage in our case, but not all hospitals have access to such resources. While ethical issues surrounding access to care for XDR carriers and the collective risks these pose to other hospital patients have been discussed, many questions remained unanswered.^[6,7]

In addition, the patient's care was costly, as an entire paramedical team was set up just for him. In a system with limited resources, it goes without saying that care provided to 1 patient is not available to others.

In short, it appears that care management did not satisfy the 4 fundamental ethical principles in this case.

With hindsight, one might speculate as to why the decision was made to repatriate the patient. One motivation was to take advantage of the French health care system and to obtain a

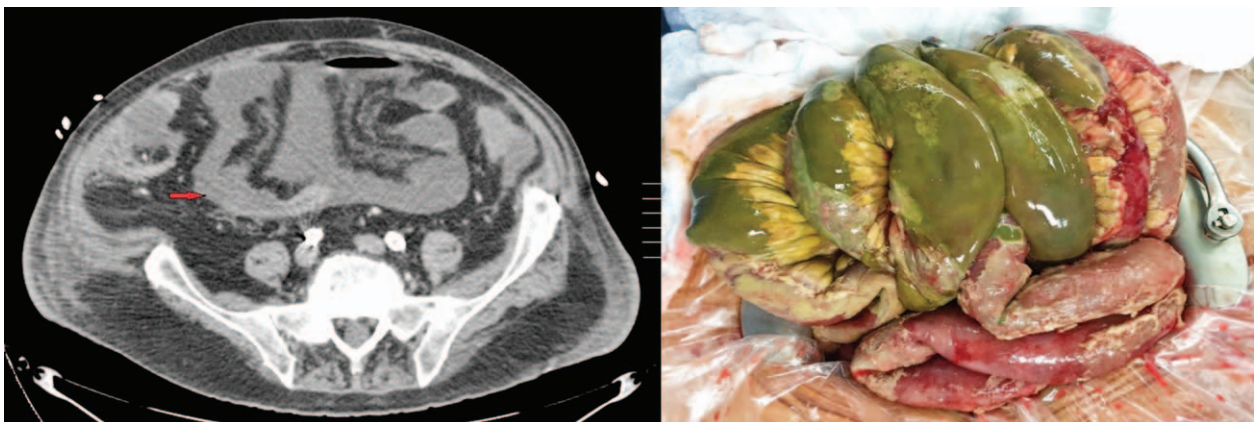


Figure 1. A, Computed tomography scan performed at intensive care unit admission showing a multisegmental enlarged parietal enlargement associated with free peritoneal effusion in the process of partitioning. B, Exploration of the abdominal cavity by laparotomy, showing a severe mesenteric infarction with peritonitis.

second medical opinion. Evacuation was requested by the patient's wife and by the insurance company, though probably for different reasons. The patient's wife expected her husband's health to improve—an understandable but probably naive opinion. The insurance company's request is more difficult to interpret given the important financial stakes involved.

Another possible motivation was to ensure that the patient would die in his country of origin. This may in fact have been the patient's wish (though we had no way of knowing), but it may also be that the family wanted his repatriation for cultural or financial reasons. It should be noted, however, that Reunion Island is an overseas territory located at a distance of 10,000 km from metropolitan France, and that it is therefore quite far from the patient's place of residence.

Bennett^[2] has written on the ethical implications of evacuating catastrophically injured individuals from operational theaters of war. In her conclusion, she argues that aeromedical repatriation is to be favored in this type of situation, regardless of predicted outcome or substantial resources required. However, in a context where supervisory authorities are demanding greater efficiency in the health care system, and where an increasing number of medico-economic studies are made available to practitioners, it seems relevant to ask whether such medical evacuations are indeed justified.^[8]

It is worth adding that this situation is not exceptional. We have already reported several cases of patients who spent time abroad before being repatriated and treated in our ICU.^[9] Among patients who had stayed in Madagascar in the 6 months prior to ICU admission, we found an ICU mortality rate of 21% and a Severity Acute Physiological Score II of 53. Carriage of and infection with Multidrug-resistant bacteria on ICU admission were also significant (with rates of 37% and 9.7%, respectively).^[9]

Although we were not satisfied with how this case was managed, the alternative would have consisted in refusing the patient's transfer to our ICU, which seemed impossible at the time. The information provided to us by the insurance company was insufficient to establish that care in our ICU would prove futile. In fact, in cases of medical evacuation, a discrepancy is often observed between the patient's clinical status and the medical data transmitted by the insurance company or the foreign medical team in charge of the patient. Improved communication between medical institutions could help better manage these complex cases.^[10] As questions remain unanswered, management should ultimately be based on a case-by-case evaluation of the potential benefit of providing care to a patient relative to the risk this poses to other patients in the unit.

4. Conclusions

On the basis of this case, we conclude that repatriation of critically ill patients from abroad should be considered according to ethical criteria, evaluating, if possible, the expected benefits

and ecological risks incurred. Limiting unnecessary transfers could be an effective measure to limit the spread of XDR bacteria.

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References

- [1] Lepelletier D, Berthelot P, Lucet JC, et al. French recommendations for the prevention of “emerging extensively drug-resistant bacteria” (eXDR) cross-transmission. *J Hosp Infect* 2015;90:186–95.
- [2] Bennett RA. Ethics surrounding the medical evacuation of catastrophically injured individuals from an operational theatre of war. *J R Army Med Corps* 2016;162:321–3.
- [3] Beauchamp T, Childress J. *Principles of Biomedical Ethics*. 5th ed. Oxford University Press, New York:2001.
- [4] Thompson DR. Principles of ethics: in managing a critical care unit. *Crit Care Med* 2007;35:S2–10.
- [5] Nordmann P, Poiriel L, Toleman MA, et al. Does broad-spectrum beta-lactam resistance due to NDM-1 herald the end of the antibiotic era for treatment of infections caused by Gram-negative bacteria? *J Antimicrob Chemother* 2011;66:689–92.
- [6] Millar M. Do we need an ethical framework for hospital infection control? *J Hosp Infect* 2009;73:232–8.
- [7] Vassal P, Berthelot P, Chaussinand JP, et al. Extensively drug-resistant bacteria: which ethical issues? *Med Mal Infect* 2017;47:319–23.
- [8] Thibodaux DP, Bourgeois RM, Loeppke RR, et al. Medical evacuations from oil rigs off the Gulf Coast of the United States from 2008 to 2012: reasons and cost implications. *J Occup Environ Med* 2014;56:681–5.
- [9] Allyn J, Angue M, Corradi L, et al. Epidemiology of 62 patients admitted to the intensive care unit after returning from Madagascar. *J Travel Med* 2016;23: taw023.
- [10] Grace RF, Penny D. Travel insurance and medical evacuation: view from the far side. *Med J Aust* 2004;180:32–5.