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Medical treatment of seafarers in the Southern Indian Ocean — interaction between the French Telemedical Maritime Assistance Service (TMAS) and the medical bases of the French Southern and Antarctic Lands (TAAF)

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ABSTRACT

Background: *The waters surrounding the French Southern Lands are a fishing zone, accessible only by sailing for several days in a region where weather conditions are often difficult. The scientific bases of the region have medical staff whose services can be called upon if seafarers require assessment and rapid medical treatment. We conducted an epidemiological study of the maritime teleconsultations carried out by the French Telemedical Maritime Assistance Service (TMAS), where patients navigating in the Southern Indian Ocean zone were advised to disembark on the medical bases in the French Southern Lands, between 2015 and 2020, to receive medical treatment.*

Materials and methods: *We extracted data from all of the maritime records from 1 January 2015 to 31 December 2020 relating to patients who attended a maritime teleconsultation with a French TMAS doctor in the Southern Indian Ocean zone and who had been redirected to the medical bases in the French Southern Lands. Data were collected on the patients' age, gender, nationality, rank, type of vessel, teleconsultation diagnosis, patient management on board and in the French Southern Lands medical bases, as well as the medical outcome. We carried out a descriptive data analysis.*

Results: *French TMAS doctors managed 11,908 cases including 76 in the Southern Indian Ocean zone (0.6%). Nineteen (25%) patients were redirected to the French Southern Lands over the study period. Eighteen patients were men with an average age of 45 ± 10 years. Eighteen patients were on board a trawler and 11 of them were sailors. Nine patients were treated for a trauma-related condition, 8 for a medical condition and 2 for a surgical disease. Eleven (58%) patients were evacuated to Reunion Island and 8 (42%) patients received medical treatment and were able to re-embark aboard their vessel.*

Conclusions: *Relatively few patients are redirected to the French Southern Lands for medical assistance, but referrals occur on a regular basis. The presence of these medical bases is unusual in a maritime setting, but they can be a valuable asset when maritime medical assistance is required in this region. The type*

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of condition encountered, and the patient profile, were typical of the fishing community. The presence of these bases and communication between the various stakeholders delivering maritime medical assistance provided these patients with optimal care despite their isolated location.

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Key words: French Telemedical Maritime Assistance Service (TMAS), teleconsultation, maritime, Indian Ocean, French Southern and Antarctic Lands (TAAF)

INTRODUCTION

In the maritime setting, seafarers are most exposed to accidents at work [1]. In France, the accident and mortality rate for seafarers is 5 times higher than that of construction workers [1]. It is rare to have medical or paramedical personnel on board as this only becomes a mandatory requirement when over 100 people are on board for a crossing lasting more than 48 hours. If there is no doctor on board, the ship's captain is responsible for on-board care [2]. Even if the captain has maritime medical training, the on-board management of patients may require rapid medical advice. The person in charge of treatment will initially seek medical advice by teleconsultation from the French Telemedical Maritime Assistance Service (TMAS) doctor in Toulouse, which exists since 1983 [3]. Following the teleconsultation, the patient may require assistance ashore.

Since 1979, the Hamburg Search and Rescue (SAR) Convention [4] has outlined the areas of responsibility of the Maritime Rescue Coordination Centres (MRCCs) of different states, and has organised their collaboration. In the Southern Indian Ocean zone, France is responsible for the Reunion SAR, which extends from Reunion Island to the southern islands, namely Kerguelen, Crozet, Saint-Paul and Amsterdam (Fig. 1).

The scientific and fishing expeditions undertaken in this extremely isolated area (between 3 and 9 days sailing time from Reunion Island) warrant a medical presence and local treatment provision. Three medical bases have therefore been created on the French Southern Islands and four doctors are permanently stationed there: two in Kerguelen, one in Crozet and one in Saint-Paul/Amsterdam. In addition, the supply ship serving these islands, the Marion Dufresne, has a doctor on board during its rotations in the southern hemisphere as well as on-board hospital. All of these medical bases are well equipped for practice in an isolated environment: consultation room, dentistry equipment, hospitalisation rooms, imaging room, dedicated laboratory testing facility and a functional operating theatre.

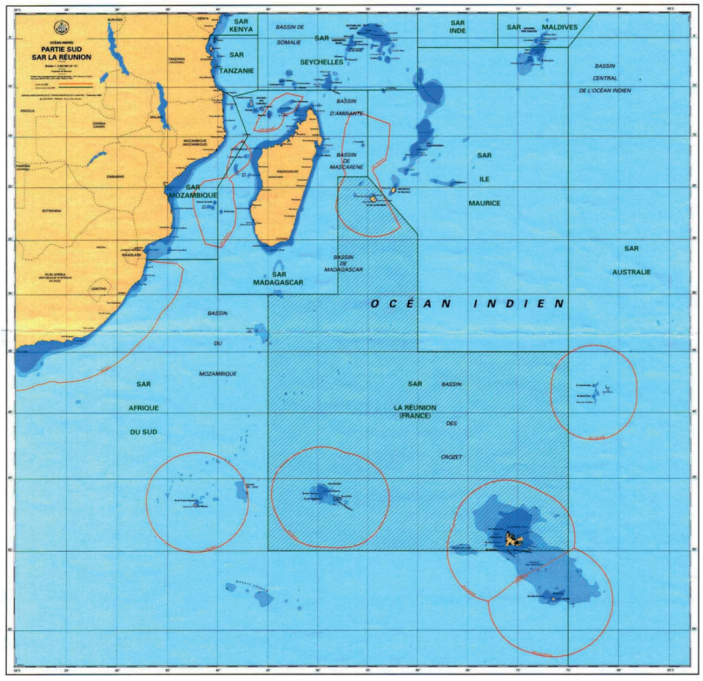

Figure 1. French Search and Rescue zone in the Southern Indian Ocean [Source: Arrêté n° 74/2009 du 13 Janvier 2009. Préfecture de La Réunion]

We conducted an epidemiological study to analyse the maritime teleconsultations carried out by the French TMAS in the Southern Indian Ocean zone between 2015 and 2020. The patients disembarked to receive treatment at the medical bases in the French Southern Lands.

MATERIALS AND METHODS

We conducted an observational, descriptive, cross-sectional and retrospective study from 1 January 2015 to 31 December 2020.

STUDY POPULATION

We included all patients who attended a French TMAS maritime teleconsultation in the Southern Indian Ocean zone and who were subsequently redirected to one of the French Southern Lands bases. We also included patients for whom maritime evacuation from the Southern Lands bases had been requested.

DATA COLLECTION

Each teleconsultation performed by the French TMAS is recorded in a medical record within a dedicated app (AppliCCMM®). The following data are collected on each call: the patient's details (age, gender, nationality, rank, symptoms, on-board medical care, care on the medical bases), the type of vessel and its geographical location, and the final treatment decision. The data for our study were extracted from these records and then anonymised.

ETHICS

During the teleconsultation, the patients were informed that their anonymised data could be used for research purposes. The procedure complied with the Declaration of Helsinki [5]. In compliance with the French Public Health Code, this retrospective study follows the MR-004 regulatory procedure on the processing of personal data for study, assessment and research purposes not involving human persons. It is recorded in the internal MR-004 registry of Toulouse University Hospital (CNIL [French Data Protection Act] number: 2206723 v 0).

DATA ANALYSIS

The data were extracted and anonymised from AppliCCMM® in Microsoft Excel 2007® format (Microsoft Corporation, Redmond, WA). A TMAS doctor verified and validated the data extracted from the app prior to their inclusion. The statistical analysis was conducted using Microsoft Excel 2007® software (Microsoft Corporation, Redmond, WA).

The categorical data were expressed in frequencies and percentages. The continuous variables were expressed as mean standard ± deviation.

RESULTS

Between 1 January 2015 and 31 December 2020, the French TMAS doctors managed 11,908 cases including 76 in the Southern Indian Ocean zone (0.6%). Nineteen (25%) of these cases were redirected to one of the French Southern Lands bases for medical treatment.

SOCIODEMOGRAPHIC DATA

Most of the patients were men (n = 18; 95%) with an average age of 45 ± 10 years. The youngest patient was 20 years of age and the eldest 63 years of age. Eight (42%) patients were French. Eighteen (95%) patients were on board a trawler. The other characteristics are presented in detail in Table 1.

CONDITIONS AND TREATMENTS

Nine (47%) patients presented with a trauma-related condition (Table 2, patients 1 to 9), 8 (42%) patients had medical disease (Table 2, patients 10 to 17), and 2 (11%) patients had surgical disease (Table 2, patients 18 and 19).

Thirteen (68%) patients were initially treated on board by the crew on the advice of the French TMAS doctor before arriving in the French Southern Lands.

Table 1. Characteristics of the study population

		Population (n = 19; 100%)
Age ± SD [years]		45 ± 10
Gender ratio; M/F		18/1
Rating	Sailor	10 (53%)
	Qualified fisherman	2 (11%)
	Mechanic	2 (11%)
	Lieutenant	1 (5%)
	Chef	1 (5%)
	Boatswain	1 (5%)
	Scientist	1 (5%)
	Other	1 (5%)
Nationality	French	8 (42%)
	Indonesian	4 (21%)
	Australian	2 (11%)
	Russian	2 (11%)
	Madagascan	1 (5%)
	Ukrainian	1 (5%)
	Not specified	1 (5%)
Type of ships	Trawler	18 (95%)
	Research vessel	1 (5%)

F — female; M — male; SD — standard deviation

Table 2. Conditions and overall management

Patient	Diagnosis	Treatment administered by the French TMAS	Treatment on the TAAF	Final decision
1	Abscess following a hook wound	Amoxicillin and clavulanic acid, paracetamol, chlorhexidine	Abscess debridement, antibiotics, topical treatment	Return to ship
2	Traumatic amputation, lower limb		Debridement of lacerated wound, lower limb	EVASAN
3	Glenohumeral dislocation	Amoxicillin and clavulanic acid, paracetamol, tramadol	Consultation	Return to ship
4	Foreign body	Amoxicillin and clavulanic acid, paracetamol, tramadol	Foreign body removal	Return to ship
5	Foreign body	Amoxicillin and clavulanic acid, paracetamol	Foreign body removal	Return to ship
6	Upper limb injury	Ketoprofen, omeprazole, paracetamol	Consultation	Return to ship
7	Neck injury	Paracetamol	Consultation, neck collar, radiography	EVAMED
8	Abscess	Amoxicillin and clavulanic acid, paracetamol	Abscess debridement	EVASAN
9	Abscess		Abscess debridement, antibiotics, topical treatment	EVAMED
10	Decompensation, infected oedema/ascites	Omeprazole	Hospitalisation, lab, fluid therapy	EVAMED
11	Chest pain of cardiac origin		ECG, treatment of coronary syndrome, monitoring	EVAMED
12	Epididymo-orchitis		Consultation, antibiotic therapy	EVAMED
13	Chest pain of cardiac origin	Amoxicillin and clavulanic acid, acetylcysteine, nitrendipine, paracetamol, nitroglycerine	ECG, treatment, monitoring	EVASAN
14	Gastritis	Omeprazole	Consultation, monitoring	Return to ship
15	Abdominal pain	Paracetamol, phloroglucinol	Consultation	Return to ship
16	Pulmonary embolism		Ultrasound, laboratory tests, oxygen therapy, curative anticoagulation, ECG, monitoring	EVAMED
17	Gastritis	Metopimazine, omeprazole, paracetamol	Medication, monitoring	Return to ship
18	Appendicitis	Paracetamol, tramadol	Ultrasound, laboratory tests, antibiotic therapy	EVAMED
19	Appendicitis		Ultrasound, laboratory tests, antibiotic therapy	EVAMED

ECG — electrocardiogram, EVAMED — evacuation with medical doctor, EVASAN — evacuation without medical doctor; TAAF — French Southern and Antarctic Lands; TMAS — Telemedical Maritime Assistance Service

At the end of the medical treatment at the Southern Lands base, 8 patients required medical evacuation to Reunion Island, either on board the Marion Dufresne or on board their ship accompanied by a base doctor. The treatment received by each patient is described in Table 2.

DISCUSSION

The study of these data over a period of 6 years highlights the importance of the medical presence in the French Southern Lands for seafarers in the Southern Indian Ocean who require medical assistance whilst at sea. Indeed,

a quarter of the individuals who consulted the French TMAS for medical advice were redirected to the southern bases where they were treated by a doctor.

The characteristics of the patients treated are consistent with our knowledge of seafarers and fishermen since most of the patients were on board fishing trawlers [6, 7]. The vast majority of patients were male, with only one female having to be redirected. This explains the absence of gynaecological conditions. The patients were all relatively young, of working age, with a mean age of 44.5 years. The youngest patient was 20 years of age and the eldest 63 years of age.

Only 42% of the patients were French. This emphasises the importance of having an international maritime medical assistance organisation as patients with at least six different nationalities required treatment. It also highlights difficulties associated with the language barrier, the likelihood of discovering exotic pathologies hitherto unknown in France and the follow-up of these seafarers by an occupational health system that may be very different from the French system.

Most of the seafarers were treated for trauma (47%). This is not surprising given the difficult working conditions of seafarers. The main reason for requesting a French TMAS teleconsultation in a maritime setting is of a medical nature, except for fishing vessels, where consultations are mostly trauma-related [1, 8]. The majority of these traumas required a medical procedure (wound debridement, abscess incision, removal of a foreign body) and the intervention of a doctor from one of the bases. Indeed, when procedures were concluded successfully, patients were able to rejoin their vessel without the need for evacuation. Only the most serious cases (amputation, major infection, etc.), which exceeded the medical bases' hospital resources, required evacuation. However, treatment was initiated on site in all cases. It is interesting to note that 11% of the conditions involved surgical diseases. Appendicitis was diagnosed in all cases. This is not surprising since the most common surgical disease in under 50-year-olds in the general population is appendicitis [9]. The conservative (medical) treatment of appendicitis has a 90% success rate [10]. It is therefore very interesting to note that a seafarer presenting with appendicitis can have a relatively rapid assessment by a doctor followed by medical treatment, before going ashore where a surgical procedure may be indicated at a later date.

Among the medical conditions, most of the patients for whom redirection was requested presented clinical signs of heart disease or epigastralgia. Only 2 patients had another medical condition. However, we know that some coronary artery diseases manifest as epigastric pain – hence these patients should indeed have an electrocardiogram and medical assessment as soon as possible if the pain is indicative of coronary artery disease. Although not all pain proved to be of coronary origin, the harsh working conditions and the profile of the patients on board are factors that suggest the onset of myocardial ischaemia. In these situations, intervention by the medical base doctors culminated in patients being diagnosed and treated much earlier than if they had stayed on board a ship until returning ashore, given the close proximity of these bases. Evacuation to Reunion Island, possibly with medical assistance, can also be arranged.

It is interesting to note that in 68% of the regulated, redirected cases, treatment and monitoring were initiated on board at the request of the French TMAS regulator. This highlights the merits and importance of having access to teleconsultations as well as the significance of having at least some medically trained staff on board [11]. Crew members should be trained in monitoring vital signs and assessing patients in order to provide the French TMAS with the best possible assessment.

Finally, in all cases, collaboration between the French TMAS, French Southern Land doctors (base doctors, doctors based on Reunion Island and on the Marion Dufresne) and the MRCC of Reunion Island ensured that all patients received the best possible care, from arriving at the bases to possible evacuation to Reunion Island with a medical team on hand to treat the patients on arrival. We can clearly see the patient benefits of this maritime medical assistance organisation in conjunction with the specific features of the French Southern Lands medical bases operating in this region. Patients can be secure in the knowledge that medical assistance is at hand despite the extreme isolation of their workplace.

CONCLUSIONS

Although relatively few patients are redirected to receive medical treatment on the French Southern Lands bases, referral regularly occurs and is vital for the individual. This pathway is even more valuable because of the precarious situation in which patients find themselves. The presence of these bases is still unusual in a maritime setting but, despite the fact that this is not their primary role, they are proving to be a valuable asset in providing maritime medical assistance for seafarers navigating the surrounding waters and who find themselves in difficult and extremely isolated conditions. For the patients treated, access to the bases has been beneficial and has provided them with access to quality care or even medical evacuation despite their remote location. This medical presence is therefore not negligible. Indeed, it is a precious asset not only for those on site but also for all seafarers in the region who require urgent medical assistance.

Communication between French TMAS, French Southern Lands doctors, MRCC and possibly specialised medical teams on Reunion Island has enabled patients to receive the right treatment at the right time.

Conflict of interest: None declared

REFERENCES

1. ENIM [Internet]. Report 2017: Maritime Occupational Injuries and Diseases. https://www.enim.eu/sites/default/files/diaporama/enim_rapportactivite_bd.pdf (cited 2022 May 05).
2. French department of the sea [Internet]. Order of July 2, 1999 concerning the medical training of personnel serving on board commercial and pleasure vessels armed with a crew role. https://www.legifrance.gouv.fr/ affichTexte.do? (cited 2022 May 05).
3. Prime Minister's Circular [Internet]. Instruction on the organisation of medical assistance at sea, 29 August 2011. http://circulaires.legifrance.gouv.fr/pdf/ 2011/11/cir_34077.pdf (cited 2022 April 29).
4. United Nations [Internet]. Convention on the Carriage of Goods by Sea, Hamburg, 31 March 1978. https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg_no=XI-D-3&chapter=11&clang=_en (cited 2022 May 05).
5. Declaration of Helsinki [Internet] Ethical Principles for Medical Research Involving Human Subjects. https://www.wma.net/policies-post/wma-declaration-of-helsinki-ethical-principles-for-medical-research-involving-human-subjects/ (cited 2022 September 21).
6. ENIM [Internet]. Activity Report 2013. https://www.enim.eu/sites/default/files/fichier_insert/enim-ra2013-bd_imp_diff.pdf (cited 2022 May 05).
7. Dehours E, Tourneret ML, Roux P, et al. Benefits of photograph transmission for trauma management in isolated areas: cases from the French tele-medical assistance service. Int Marit Health. 2016; 67(2): 83–87, doi: 10.5603/IMH.2016.0017, indexed in Pubmed: 27364173.
8. Cécile Gabart [Internet]. Traumatology in ocean racing: an epidemiological survey from 2008 to 2015. Human Medicine and Pathology. 2016. https://dumas.ccsd.cnrs.fr/dumas-01425232 (cited 2022 May 05).
9. Addiss DG, Shaffer N, Fowler BS, et al. The epidemiology of appendicitis and appendectomy in the United States. Am J Epidemiol. 1990; 132(5): 910–925, doi: 10.1093/oxfordjournals.aje.a115734, indexed in Pubmed: 2239906.
10. Wojciechowicz KH, Hoffkamp HJ, van Hulst RA. Conservative treatment of acute appendicitis: an overview. Int Marit Health. 2010; 62(4): 265–272, indexed in Pubmed: 21348022.
11. Pujos M, Roux P, Tabarly J et al [Internet]. Maritime telemedical consultation and regulation. Maritime Medical Consultation Center. Urgences 2013. https://www.sfmu.org/upload/70_formation/02_eformation/02_congres/Urgences/urgences2013/donnees/pdf/031_Pujos.pdf (cited 2022 May 05).