

Emergency management north of the Shenzhen River

CH Chung, AYC Siu, KK Lai

A study was carried out in a district hospital located close to the Hong Kong - Shenzhen border, in order to get a picture of the epidemiology of diseases and injuries sustained by Hong Kong residents in China. The emergency medical treatment provided and the degree of patient satisfaction were also analysed. The majority of the patients were adult males. Trauma constituted more than 50% of the attendance, with traffic accident and common assault being the leading causes. This group of Hong Kong residents preferred to be treated in Hong Kong hospitals because of perceived better quality of care. There was a high demand on the local ambulance service and this might have financial and resource implications. (*Hong Kong j.emerg.med.* 2000;7:4-10)

Keywords: China, Hong Kong, emergency management, emergency department

Introduction

Hong Kong is a 'special administrative region' of China, separated by the Shenzhen River from the rest of China. Hong Kong residents enjoy free movement across this 'border'. However, access to Hong Kong is strictly controlled for residents from other parts of China. Across this administrative boundary, there are 4 strategically located customs and immigration ports - Lok Ma Chau, Lo Wu, Man Kam To and Sha Tau Kok. All the 4 ports are situated within the ambulance catchment area of North District Hospital (NDH). As a result, nearly all patients returning from China by land seeking urgent medical attention are initially sent to its Accident & Emergency (A&E) Department.

North District Hospital, located at Fanling and Sheung Shui district, is a hospital with a planned capacity of 618 beds. It serves a population of about 270,000 in the northeastern part of the New Territories. Its catchment area starts from Mai Po

on the West, Sha Tau Kok on the East, the Shenzhen River on the North and Tai Hang on the South. It started limited clinical services in February 1998. There were four major inpatient clinical services, namely, general medicine, general surgery, orthopaedic and paediatrics. Twenty-four hour emergency service began in August 1998, with a hospital bed capacity of around 400 at that time. As specialist support was not comprehensive, interhospital referral and transport was a characteristic. Its strategic position facilitated studies on diseases contracted or injuries sustained by Hong Kong residents in China, the types of emergency medical treatment they received and their level of satisfaction. Emergency and trauma care have received increasing attention and emphasis in China in recent years^{1,2} and it would be interesting to see their level of development. The impact of this group of travellers on the ambulance and emergency medical services in Hong Kong is interesting and has financial implication as well.

The aim of this study was to study the epidemiology and medical encounters in this special group of patients; hereinafter called 'returnees'. Statistics and epidemiology of all other patient attendance during the same period, hereinafter called 'non-returnees', would also give an idea of the workload of this emergency department. Comparison between the two groups would give a better picture of the

Correspondence to:

Chung Chin Hung, Consultant-in-Charge

North District Hospital, A&E Department, 9 Po Kin Road, Fanling, N.T., Hong Kong SAR, China.

Email: chunch@ha.org.hk

Siu Yuet Chung Axel, Senior Medical Officer

Lai King Kong, Hospital Chief Executive

characteristics of the 'returnees' as distinct from that of the 'local' attendees.

Subjects and methods

Border statistics

Statistics concerning passenger and vehicular traffic across the border were obtained from the homepage of the Government of the Hong Kong Special Administrative Region³ through the Internet. The opening hours of the 4 ports were confirmed through direct telephone communication.

Patient data

For a 3-month period from 1st November 1998 to 31st January 1999, all patients just returned from China seeking immediate medical attention at the Accident & Emergency Department of North District Hospital were entered into the study. Patients' personal particulars and reasons for going to China were collected. The date and time of accident or first symptoms, nature of accident or chief complaints, location and hospital in China, duration of hospital stay, diagnosis made, investigation done, treatment given and medical expenses were obtained. Reasons for returning to Hong Kong, reasons for coming to North District Hospital, transport used in China to the border, transport used in Hong Kong from the border to the hospital and overall satisfaction on the medical care provided in China were asked. If the patient preferred admission to hospitals other than North District Hospital, the underlying reasons were inquired. The emergency department diagnosis was compared with that in China. Patients were encouraged to make further comments on the medical care received in China. Photographs were taken for interesting or special forms of treatment provided in China. Medical records from China, if available, were photocopied for reference and analysis. The A&E medical records were also photocopied and attached. The data were entered into Microsoft Excel software.

Attendance statistics at the A&E department during the same 3-month period were retrieved from the 'Accident & Emergency Information System' of the hospital computer registry, developed by the Hospital Authority Information Technology Team.

The two sets of patient data were compared and analysed with the chi-square test, using the Statistical Program for Social Science, version 7.0 of SPSS Inc.

Results

Border statistics

From the statistics of the Government of the Hong Kong Special Administrative Region, the total number of travellers crossing the border by land in 1998 was 77,027,360 (excluding drivers) and this works out to be an daily average of 211,034. The total number of vehicles crossing the border in 1998 was 9,772,728 (daily average of 26,775). Obviously, the magnitude of traffic and people movement across the border was immense. The opening hours of the 4 ports were as follows: -

Sha Tau Kok	Passenger	07:00 - 20:00 hours
	Goods	07:00 - 18:00 hours
Man Kam To	Passenger	07:00 - 20:00 hours
	Goods	07:00 - 22:00 hours
Lo Wu	Passenger & Goods	06:30 - 23:30 hours
Lok Ma Chau	Passenger	07:00 - 22:00 hours
	Goods	24 hours

Attendance characteristics

The total attendance of this group of returnees for the 3-month period was 409, averaging 4.5 patients daily. However, the attendance range was from 1 to 11 daily. On average, attendance rate on Sunday was highest with an average of 6.2 patients and Thursday lowest, with an average of 3.5 patients. The majority of the returnees attended in the afternoon and evening - 203 (49.6%) between noon and 18:00 hours and 127 (31.1%) between 18:00 hours and midnight. Nearly all the remaining returnees attended in the forenoon.

During the same 3-month period, the total emergency attendance at the A&E Department of North District Hospital was 27,814, an average of 309 daily. Thus, the returnees constituted 1.1% of the total A&E attendance.

Sex and age distribution

The Male to Female ratio of returnees (302:107) was 2.8, in sharp contrast to the 1.1 ratio in the non-returnees of the same period. This was statistically

significant ($p < 0.001$). The overwhelming majority of the returnees were adults: 237 (58.2%) were between the ages of 21 to 60 and 125 (30.6%) were above age 60.

Trauma statistics

The majority of the returnees suffered from injuries of varying severity (219 or 53.5%), with preliminary stabilisation and treatment in China. Eighty-six of them had fractures (39.3%). The high percentage of trauma in the returnees was statistically significant compared with the local figure of 19.0% ($p < 0.001$).

Traffic accident and common assault were the leading causes in the returnees, in contrast to domestic and industrial accidents in the non-returnees. (Table 1) A substantial proportion of the common assault in China was claimed to be the

result of robbery. Head and neck injuries (64) were the commonest, followed by lower limb (51) and upper limb injuries (34). Forty-five patients had multiple injuries of three or more sites.

Disease characteristics

Specialty classification is shown in Table 2. The specialty ranking in number of attendance were Surgery > Medicine > Orthopaedic > Paediatrics for returnees and Medicine > Paediatrics > Orthopaedic > Surgery for non-returnees. Of the 190 non-trauma returnees, 38 had cerebrovascular disease. Other common presentations included gastroenteritis, chest pain, chest infection, shortness of breath and upper respiratory infection.

Triage categories are shown in Table 3. The majority of returnees were classified as category 3 (urgent) in

Table 1. Trauma type

Mode	Returnee	Non-returnee	Total
Domestic	45 (20.5%)	2,155 (41.5%)	2,200
Industrial	9 (4.1%)	1,266 (24.4%)	1,275
Traffic	80 (36.5%)	385 (7.4%)	465
Sports	4 (1.8%)	389 (7.5%)	393
Common Assault	63 (28.8%)	388 (7.5%)	451
Indecent Assault	0 (0%)	2 (0%)	2
Abuse	1 (0.5%)	8 (0.2%)	9
Self-inflicted	0 (0%)	10 (0.2%)	10
Unclassified	17 (7.8%)	594 (11.4%)	611
Total	219 (100%)	5197 (100%)	5416

Table 2. Specialty classification

Specialty	Returnee	Non-returnee	Total
Medicine	120 (29.3%)	9,807 (35.8%)	9,927
Surgery	133 (32.5%)	3,778 (13.8%)	3,911
Paediatrics	19 (4.6%)	5,983 (21.8%)	6,002
Orthopaedic	118 (28.9%)	4,496 (16.4%)	4,614
Gynaecology	4 (1.0%)	329 (1.2%)	333
Obstetrics	2 (0.5%)	130 (0.5%)	132
Psychiatry	0 (0%)	85 (0.3%)	85
Eye	4 (1.0%)	783 (2.9%)	787
Ear Nose Throat	5 (1.2%)	492 (1.8%)	497
Dermatology	0 (0%)	160 (0.6%)	160
Dental	0 (0%)	230 (0.8%)	230
Unclassified	4 (1.0%)	1,132 (4.1%)	1,136
Total	409 (100%)	27,405 (100%)	27,814

Table 3. Triage category

Triage category	Returnee	Non-returnee	Total
Critical (1)	4 (1.0%)	96 (0.4%)	100
Emergency (2)	13 (3.2%)	146 (0.5%)	159
Urgent (3)	207 (50.6%)	4,883 (17.8%)	5,090
Semi-urgent (4)	178 (43.5%)	18,057 (65.9%)	18,235
Non-urgent (5)	6 (1.5%)	3,259 (11.9%)	3,265
Unclassified	1 (0.2%)	964 (3.5%)	965
Total	409 (100%)	27,405 (100%)	27,814

contrast to non-returnees, which had a majority of category 4 patients (semi-urgent). Two hundred and seven returnees were sent in by stretchers while 75 were on wheelchairs, totalling 68.9% of the group. Statistically, the conditions of the returnees were more serious ($p < 0.001$).

Medical care and social factors

As expected, the majority of the returnees were from the Guangdong province, mostly from the Shenzhen special economic zone. However, the distribution was very wide, from as far north as Qingdao and as far south as Hainan. Medical expenses varied from zero to RMB 230,000. Duration of hospital stay in China also varied widely, up to a maximum of 4 months. However, about one-third returned to Hong Kong immediately (138 or 33.7%) and another one-third within 1 - 3 days (154 or 37.7%).

Table 4. Reasons for returning to Hong Kong

Reasons for returning	Number of returnees
Quality of care	245
Live in Hong Kong	104
Caring attitude	72
Expense	31
Personal acquaintance	21
Others	12

Table 5. Transport

Transport	From China to border	From border to NDH
Ambulance	121 (29.6%)	301 (73.6%)
Taxi/Hired car	112 (27.4%)	36 (8.8%)
Railway	54 (13.2%)	41 (10.0%)
Private car	52 (12.7%)	14 (3.4%)
Bus/van	54 (13.2%)	9 (2.2%)
Others	16 (3.9%)	8 (2.0%)

One hundred and seventy-six patients had medical records from China (43.0%). Blood test (102) and plain radiographs (166) were the commonest investigations. Other sophisticated investigations performed included ultrasonography, endoscopy, computed tomography and even magnetic resonance imaging. One hundred and seventy-eight patients were given intravenous fluids (43.3%). Herbs and acupuncture, though uncommon, were among the treatment modalities.

The reasons for going to China in descending order of frequency were: personal visit (147), sightseeing (97), business (53), employment (53), residence in China (37) and seeking medical treatment (29).

The reasons for returning to Hong Kong for treatment are summarised in Table 4. Perceived better quality of care in Hong Kong was the main reason in the majority of cases. It was interesting that medical expense in China as a factor was low in the ranking.

Transport and hospital admission

The residential addresses in Hong Kong of the majority of returnees were in the New Territories (243 or 59.4%).

The majority of the returnees (301 or 73.3%) were sent to the hospital by ambulance. (Table 5) This

was in sharp contrast to the overall 14.8% ambulance case in the same period. This was statistically significant ($p < 0.001$).

The reasons for coming to North District Hospital were summarised in Table 6. As North District Hospital was near the border, it was not surprising that most ambulancemen and patients selected it as the first stop for initial medical care.

However, if admission was advised, some patients preferred other hospitals after initial consultation and stabilisation. Only 7 patients preferred private

hospitals. The overwhelming majority had their preferences for public hospitals near their place of residence (111). Other much less common reasons included better quality of care, personal acquaintance and caring attitude.

The disposal of patients is summarised in Table 7. The admission rates and self-discharge rates were high among the returnees. There was significant statistical difference between returnees and non-returnees ($p < 0.001$).

Altogether, ambulance was used by 99 of the returnees for transfer from North District Hospital to other hospitals. Their destinations were hospitals all over the territory, not infrequently as far away as the Hong Kong Island.

The admission profile into North District Hospital is shown in Table 8. Combined surgical and orthopaedic admissions of returnees exceeded medical admissions, in contrast to non-returnees. Paediatric admissions were rare among the returnees.

Table 6. Reasons for coming to North District Hospital

Reasons to North District Hospital	Number of returnees
Directed by Ambulance Staff	186
Nearest Hospital from Border	166
Resident in North District	57
Quality of Care	12
Caring Attitude	6
Personal Acquaintance	4
Others	5

Table 7. Patient disposal

Disposal	Returnee	Non-returnee	Total
Discharged without follow-up	99 (24.2%)	18,314 (66.8%)	18,413
Disappeared before medical consultation	1 (0.2%)	645 (2.4%)	646
Discharged with A&E follow-up	13 (3.2%)	1,196 (4.4%)	1,209
Discharged with referral	26 (6.4%)	2,545 (9.3%)	2,571
Dead before arrival	0 (0%)	33 (0.1%)	33
Dead after arrival	0 (0%)	4 (0%)	4
Discharged AMA	76 (18.6%)*	422 (1.5%)	498
Admitted own hospital	157 (38.4%)	3,952 (14.4%)	4,109
Admitted/transferred to other hospitals	37 (9.1%)	294 (1.1%)	331

* 62 of this group of returnees refused admission into North District Hospital and requested ambulance transport to the A&E departments of hospitals near their place of residence

Table 8. Emergency admission specialty in North District Hospital

Specialty	Returnee	Non-returnee	Total
Medicine	75	2,116	2,191
Surgery	38	654	692
Orthopaedic	45	389	434
Paediatrics	6	761	767
Others	0	37	37

Overall impression of health care provided in China

The returnees' ratings of the quality of health care provided in China are shown in Table 9. As can be seen, the majority of the returnees were not satisfied with the medical care provided in China.

Table 9. Patient satisfaction

Rating of medical care in China	Number of returnees
Excellent	1
Good	8
Acceptable	85
Unsatisfactory	133
Poor	100

Some comments from the returnees on the medical services in China were as follows:

1. Poor hygienic condition in China
2. Poor attitude of doctors or nurses
3. Poor professional knowledge
4. Tipping is necessary
5. Being charged for each procedure
6. Long waiting time
7. Poor attention after admission

Some comments from North District Hospital doctors were as follows:

1. Needle left in wound after suturing in China
2. Retained foreign body after suturing in China
3. No medical record from China
4. No post-reduction plain radiographs in China
5. No splintage after tendon repair
6. Missed ruptured eyeball
7. Cotton or linen sutures for skin
8. Wooden splint being used for Colles' fracture (Figure 1)

Discussion

This study was the first of its kind to be carried out in Hong Kong for a very specific group of patients. The average daily attendance of 4.5 'returnees' was a surprisingly low figure, comparing with the huge number of travellers across the 'border'. A 'cross-



Figure 1. Wooden splint for fracture

region' multi-centres study with our counterparts north of the Shenzhen River is necessary to get a more complete epidemiological picture of the disease and injury patterns and other medical encounters of the travellers. The proportional significance of this group of 'returnees' among all travellers is unknown. Naturally, the comment from the returnees on their degree of satisfaction with the medical care in China might be biased. However, the findings improve our understanding on the epidemiology, care received and preferences of this group of patients who have chosen to return. This may have implications in policy and resource planning.

From the study data, it was clear that there was a high proportion of adult males among the returnees. There was a very low attendance of paediatric patients and this might account for the very low paediatric admissions. Trauma constituted more than half of the attendance, with traffic accident and common assault being the leading causes. This might explain the high percentage of surgical and orthopaedic attendance and admissions among the group. It should be noted that a substantial proportion of the injuries was the result of domestic accident (20.5%) and personal visit was the leading reason for going to China. This might indicate very close personal relationships between Hong Kong and China residents. For non-traumatic cases, stroke was the leading disease entity.

As the custom and immigration ports closed in the

late hours and time was needed for travelling back to Hong Kong, therefore the majority of the attendance was in the afternoon or evening, which incidentally coincided with the hours of high local attendance.

The majority of the returnees were sent to our hospital by ambulance from the border (73.3%). This was in sharp contrast to the usual local (14.8%) and China (29.6%) ambulance utilisation rate. Ambulance service is quite expensive in China but entirely free in Hong Kong. Ambulance staff preferred to send the patients to the nearest hospital from the border. However, a fairly substantial number (99) were subsequently transferred out of North District Hospital, partly because patients preferred admission to a hospital near their place of residence and partly because some specialist services were not available in our hospital. This also accounted for the high 'discharge against medical advice' rate. In fact, 62 of them used the ambulance service for transfer to other hospitals after self-discharge from North District Hospital to hospitals as far away as Queen Mary Hospital and Pamela Youde Nethersole Eastern Hospital on Hong Kong Island. Transport to private hospitals was uncommon. As the majority of the patients were already stabilised in China, it might be more cost-effective if selected patients were sent directly to their hospitals of preference or appropriate specialist centres from the border. Indeed, some patients complained that the Hong Kong Ambulance Service refused to transport them to their hospitals of choice.

In general, returnees suffered more serious illnesses or injuries and this was supported by higher triage categories (Table 3) and higher admission rate (Table 7) of the returnees. Multiple trauma and stroke were quite common. This pattern of distribution might have resource implications.

China is a vast country. Therefore programs of medical training and the standards of medical care vary widely in different geographical area.⁴ The majority of the returnees were from the southern part of the Guangdong province. However, the overall impression of the returnees on the medical

services in China was unsatisfactory. This concurred with the fact that seeking quality care was their leading reason for returning to Hong Kong for medical treatment.

Conclusion

Our study has shown that the emergency medical care north of the Hong Kong - Shenzhen border was in immediate need of improvement, at least in the eyes of returning Hong Kong residents.

The Hong Kong Ambulance Command should study a more cost-effective way of providing service to this special group of patients. Both patients and health care providers may not welcome the 'nearest hospital rule'. 'Getting the right patient to the right place at the right time' should be one of the future directions of the Hong Kong Ambulance Command.

There is one final advice - take extra precaution when you travel in China !

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