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NEWS AND VIEWS

President's Notebook

Emergency physicians are a unique breed of doctor, set aside from their colleagues by a desire for a different type of practice. They are primary care specialists who work in institutions, with "shift-work" hours and little involvement with continuing care. They achieve professional satisfaction through prompt intervention in real and potential threats to life and limb, delivering definitive care or stabilizing therapy. Their work hours are spent side-by-side with technicians, nurses, and other physicians working as a team in a stress-filled environment. It is small wonder that when their shift ends, many emergency physicians wish to engage in activities that are far removed from their chosen profession.

During my involvement with CAEP it has, however, somewhat surprised me how few people are willing to become involved in our organization. A common question posed by the one or two interested bystanders at our executive meetings is "What is CAEP doing for me?". It is tempting to turn the question around and paraphrase the late President Kennedy by asking, "What are you doing for Emergency Medicine?". We are a fledgling specialty breaking new ground in many areas that directly concern our profession. If we don't take our place and set standards, definitions, and recommendations, others will do it for us.

CAEP has accomplished much in its short existence:

- We have achieved specialty recognition of Emergency Medicine by both the Royal College of Physicians and Surgeons of Canada and the Canadian College of Family Practice.
- We have established a Canadian forum for Emergency Medicine and E.M.S. in the CAEP Review, whose continued existence is threatened by lack of interest.
- We have established a Research Fund Committee to solicit and distribute funds for Canadian research in Emergency Medicine.
- We have maintained a programme of quality continuing medical education at our annual Scientific Assembly.
- We have recently instituted a forum for presentation of Emergency Medicine research at the annual meeting of the Royal College of Physicians and Surgeons. The programme this year compared favourably with that of any other specialty.
- CAEP has published a position paper on CPR training, seat belt legislation, pre-hospital care, and drinking and driving legislation.
- In January of 1985, CAEP presented a brief to the House of Commons Committee on Justice and Legal Affairs giving our position on proposed new federal drinking/driving legislation.
- This past year we made representations to the Royal College of Physicians and Surgeons on behalf of some members interested in an extension of their practise-eligibility guidelines.
- CAEP has established a Paediatric Section to participate in development of standards, research, and education in paediatric emergency care in Canada.
- We have established an Economics Committee to investigate renumeration practices across the country, and make recommendations to groups who are involved in various provincial fee schedule issues.
- A Toxicology Committee was recently established to address issues in Toxicology such as regionalization of poison

control centres, standards policies, and teaching — all issues within the domain of Emergency Medicine.
- CAEP is now exploring the possibility of representation on the Council of the Canadian Medical Protective Association in order to better present the concerns of our members in the area of medical malpractice.
- We are in the process of publishing standards for undergraduate training in Emergency Medicine.
- We are participating in the Conjoint Council Subcommittee on Emergency Medicine in order to refine and expand on the current C.M.A. policies.
- CAEP is taking an active role in sponsoring public education programmes on issues such as drinking/driving. Public service announcements are already in production.
- In 1986, CAEP will be participating in the first International Conference on Emergency Medicine in London, England in conjunction with similar organizations from Australia, the United Kingdom, and the United States.

I could go on listing the activities that our organization is involved in, but I am sure that you realize that the issues concerning CAEP impact strongly on the practice of Emergency Medicine. If we abrogate our responsibility to our specialty, we forfeit our future. The groundwork for Emergency Medicine has been laid down by the "grandfathers", and now we must further refine their definitions by staking out that body of knowledge and research that is peculiar to us. We cannot sit back and hope that someone else will do it for us. Committees need members. Research needs implementation and our organization needs your support. The future is ours, if we want it.

Sheldon Glazer, MDCM, FRCP(C)
President, CAEP

Emergency Symposium '86

NENA

INTER PHASE

CAEP

For the first time, three major organizations involved in Emergency Health Care will meet at the same time and under the same roof.

THE CANADIAN ASSOCIATION OF EMERGENCY PHYSICIANS

THE NATIONAL EMERGENCY NURSES AFFILIATION

INTERPHASE

PLACE: Edmonton Convention Centre
DATE: May 25th to 29th 1986
INFORMATION: Emergency Symposium '86
10510-107 Avenue
Edmonton, Alberta,
T5H 0W2

Toxicology Committee of CAEP

Emergency Medicine has been described as a specialty of breadth. Nevertheless, there are several well-identified areas within the specialty of particular interest and expertise, such as Prehospital Care and Resuscitation. Added to these should be Toxicology. In most centres, Emergency physicians, along with intensivists, are frontline in managing acute poisoning incidents. Because of the lack of Regionalization of Poison Control Centres in many provinces, poison control information is, by default, a function of the Emergency Department in many communities.

Recognizing Toxicology as an integral part of the practice of Emergency Medicine, CAEP has recently formed a Toxicology Committee. The inaugural meeting of this committee was held in Ottawa in June at the Annual CAEP Conference. Several goals of the committee were identified:

1. To encourage Emergency Physicians to take leadership roles with respect to Toxicology concerns and issues locally (hospital/medical school/community);
2. To support Regionalization of Poison Control Centres;
3. To collaborate with the existing Poison Control Network in collecting poison statistics;
4. To promote public education regarding Poisonings and their prevention;
5. To promote Research in Toxicology among Emergency Physicians.

I am, at this time, campaigning to seek out those individuals who are interested in Toxicology and who would be willing to contribute in any way to the Toxicology Committee.

If you have such an interest or if you have any questions, please use the tear-out form below.

I. Vicas, M.D.C.M.
Chairman, Toxicology Committee

- -

☐ *I am interested in participating in the Toxicology Committee.*
Name: _____
Address: _____
City: _____ *Postal Code:* _____
Phone: (bus.) _____ *(home)* _____

☐ *I would like the Toxicology Committee to consider these ideas/suggestions:*
_____
_____
_____
_____

Send to:
Dr. I. Vicas
Division of Emergency Medicine
FOOTHILLS HOSPITAL
1403 - 29th Street N.W.
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Resident's Corner

FUTURE CHALLENGES CONFRONTING EMERGENCY MEDICINE IN CANADA

There have been many positive achievements in the establishment of emergency medicine as a specialty in Canada, yet there remain a number of challenges confronting its evolution. Concern still exists, both from within and outside the specialty[10], for clarification of the role of family physicians and specialty trained emergency physicians in providing emergency care. Organizing cost-effective EMS systems in both large cities and smaller communities also provides a perplexing problem that requires critical evaluation of currently existing services. Currently, there are marked differences in the structure of existing EMS systems in Canada, as well as a disparity in the capacity of such systems to provide advanced prehospital life support (ALS). Resolving these issues will be a gradual process, which may be facilitated by anticipating potential problems through assessment of the objectives, advantages and disadvantages of different EMS systems in both the United States and Canada.

The growth of Emergency Medicine in Canada has lagged behind, yet paralleled, the growth of the specialty in the United States. The numerous publications[1,2,3] and editorials[4,5,6,7] describing the growing pains of our American colleagues provide interesting reading, some of which may be relevant to Canadian emergency medicine. Perhaps the most controversial depiction of the changes taking place in the practice of community emergency medicine was presented by Crippen[1] in which he refers to the "rise and fall" of the specialty, and suggests that the long-term viability of emergency medicine outside the major tertiary care hospitals is in doubt. This prediction was based on the recognition of rising economic pressures and the cost-effectiveness of primary emergency care as well as the apparent dissatisfaction of specialty trained emergency physicians practising "Outpatient Family Medicine" in an emergency department setting. Although the economic realities of medical practice are considerably different in the United States, Crippen's article[1] contains valuable insights into the political importance of cost-effective emergency medicine, which are worth reading. However, as a resident in Emergency Medicine it is certainly more distressing to read of the disillusionment with the specialty created by board certified emergency physicians treating the "hordes of stupidity-related disorders, abusive drunks, obnoxious relatives and chronic manipulators".[8] This is in dramatic contrast to the expectation emergency physicians had that they would deal with the "cream of acute-care medicine" and relegate the "remaining mundane and chronic aspects of follow up care to consultants".[8] The author has in fact suggested[8] that Family Practitioners may be more interested and effective in community emergency practice as they "trained realistically" toward dealing with primary care. Accordingly, in the United States the "stage is set for the development of Emergency Medicine superspecialists in an attempt to insulate emergency physicians from non-emergency complaints if (they) continue to see Family Practice walk-in patients as the bulk of (their) daily practice."

Since a number of emergency departments in the United States are providing an increasing proportion of their care to the socially disadvantaged, usually in the context of the inner city ghetto, the disillusionment expressed by Crippen[1] may be a reflection of the frustrations of emergency physicians working in this environment. In addition, a number of smaller hospitals in the United States have hired specialty trained emergency physicians when in fact a family physician competent in emergency care would be more appropriate. This potential upheaval in the infrastructure of the specialty may in fact be prevented in Canada by the availability of specialty certification by both the College of Family Physicians (CFPC) and the Royal College of Physicians and Surgeons (RCPS). The lessons learned in the United States may help clarify the somewhat debated[9,10] role of CFPC- and RCPS-trained emergency physicians in staffing emergency departments.

It would seem logical that emergency physicians trained by the RCPS would be best suited, by virtue of their training and career aspirations, to practise in academic/research-oriented positions in tertiary care emergency departments and trauma centres. In this role they would be best suited to fulfill the objectives of a specialist espoused by the Canadian Association of Emergency Physicians[10] (CAEP) in fostering research in emergency medicine, promoting the coordination of community emergency care personnel and facilities, as well as in developing effective postgraduate training programs and continuing education for emergency physicians. The corollary is that emergency physicians trained by the CFPC would provide high quality primary emergency care in regional and community hospitals and become involved in resident training and research depending upon individual career goals. Perhaps there is no need to suffer the career disillusionment of some of our American counterparts if, as residents, we can clearly define our own future career goals.

Clarification of the role of Emergency Physicians must also occur within the hospital setting for the traditional specialties to recognize the value of this new specialty. Emergency Medicine is by definition a specialty of breadth and depth[10] requiring the physician to be adept not only in the field of critical illness and injury, but also capable of intelligently evaluating medical, surgical, psychological and social emergencies. The volume of knowledge required by the specialist emergency physician can thus be overwhelming. A tally of the various specialty boards involved in the initial planning of the American Board of Emergency Medicine indicated that the desirable length of training in emergency medicine, in order to accommodate their concerns, interests and value judgements would add up to 14 years[5]. Not unexpectedly the training requirements were critically reviewed and a 3-year standardized curriculum was established[11] and is now in the process of implementation.

The philosophical argument arises however, as to whether emergency care should be provided by specialty trained emergency physicians or traditionally recognized specialists working in specialty-oriented emergency departments. The latter model exists in at least one Canadian Emergency Department that the author is aware of, providing an alternative which raises a number of potential questions. For instance, what is the role for the specialty-trained emergency physician, who is by definition a generalist, in the specialty-oriented emergency room? Will the traditional specialties recognize the expertise of the specialty-trained emergency physician and allow him to function effectively in a specialty-oriented emergency room? The answers to these questions will be determined by our ability as emergency physicians to demonstrate competence in dealing with a wide range of clinical problems, often in critically ill patients. In contrast to traditional specialists who, by definition, utilize an "organ-system" approach in patient care, the emergency physician invokes the concept of "total patient" care in assessing treatment priorities. The importance of a pathophysiological understanding of the multisystem involvement of illness and injury is germane to the initial management of patients in the emergency department. This concept represents one of the fundamental educational objectives in specialty training programs in emergency medicine helping other specialists recognize the unique aspects of our specialty.

It is my contention that specialty-trained emergency physicians working within the context of a hospital based, medi-

cally supervised pre-hospital EMS system with appropriate referral to available specialists and subspecialists, provide the most effective community-oriented emergency care. The recognition that emergency care extends outside the doors of the emergency department is a well accepted principle and argues against the effectiveness of specialty-oriented emergency rooms whose physicians, by virtue of their training, are not able to effectively train lay bystanders, paramedics and become involved in issues pertaining to disaster planning.

With the current economic and political pressures affecting medical practice, emergency physicians *must* remain cognizant of the importance of providing high quality, cost-effective health care. Due to the immediate accessability of emergency care, the emergency department often represents the public image of the hospital. Promoting good public relations, both within the community, and with other specialities within the hospital, requires recognition of, and creative responses to, the changes confronting our specialty. As Bock has stated[7], a "look into the future suggests a need for close working relationships with hospital administrators and with other physicians in the community."

Part of the challenge is also in defining the elements of medical practice unique to the specialty of emergency medicine. Virtually all aspects of pre-hospital emergency care and disaster planning are well recognized as unique to the domain of emergency medicine. Emergency physicians are also developing expertise in the somewhat neglected area of environmental emergencies, are becoming more involved in industrial and occupational medicine as well as underwater, aviation and sports medicine. In addition, emergency physicians have become involved in community health education and promoting accident prevention.

Quite clearly we should not be dismayed by the potential problems confronting the evolution of our specialty. As residents we must define our own career goals in emergency medicine, maintain a creative and optimistic outlook for the future, and work together . . . recognizing the strengths of both the CFPC and RCPS training programs in preparing us to deal with a new and challenging specialty.

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Efficacy of Tissue Aspiration Cultures in Cellulitis

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MARGARET DINGLE MD
JAMES SACAMANO MD
JOHN TAIANI MD

Abstract

Thirty-two cases of cellulitis in an adult population presenting to an Emergency Department for treatment, underwent wound aspiration cultures to identify causative bacteria. A male predominance was found, and fifty percent of patients had an associated portal of entry. Temperatures and leukocyte counts were not found to be helpful. Although the aspiration culture rate was low (18%), the clinical response to outpatient treatment was good (84%).

Introduction

Cellulitis is an infectious disease involving the skin and subcutaneous tissues. Mortality is very low, but cellulitis may have considerable morbidity, especially when involving the hand and face,[1,2] immunocompromised patients, or patients with peripheral vascular disease. Cellulitis may begin in skin damaged by venous stasis, or may result from a portal of entry caused by trauma[3] or surgery[4].

Standard references state that causative organisms include streptococcus pyogenes (Group A) and staphylococcus aureus[5], but actual documentation by tissue aspiration or blood culture has been poor[6]. Studies from the paediatric population have shown the the incidence of cellulitis cause by haemophilus influenza is increasing, especially involving the head and neck[7].

This study was undertaken to assess the efficacy of tissue aspiration in identifying the organism associated with cellulitis in an adult population presenting for emergency care, and to assess the response to treatment.

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Materials and Methods

Thirty two consecutive patients seen in the Emergency Department of the Halifax Infirmary between October 1, 1982 and August 1, 1983 were selected for study. Criteria for inclusion in the study were the presence of cellulitis and agreement to undergo would aspiration. The diagnosis of cellulitis was made by the emergency physician on duty using a predetermined set of criteria of the presence of an acute inflammatory reaction of the skin manifested by erythema, warmth, swelling, and local pain with or without lymphadenitis or lymphadenopathy. No patient refused to participate in the study, and signed consents were obtained from all participants.

Patients were excluded from the study if there was a history of any other skin or systemic infection. No evidence of osteomyelitis, phlebitis, or other diseases which could be confused with cellulitis was found on the basis of clinical assessment, x-ray examination, or reponse to treatment. Associated illnesses, if present, were documented.

Patients were classified as to age, sex, location of cellulitis, and the presence of an associated injury. Oral temperatures were recorded and a leukocyte count was obtained. Wound aspiration, by the physician on duty, was carried out by the method recommended by Umin and Kunin[8]. This method involves the aspiration of the leading edge of the cellulitis with a 22 gauge needle and a 10 cc syringe without anaesthesia. If no aspirate is obtained, 1-2 ml of non-bacteriostatic saline is injected into the tissue, and aspirated. The syrine is then stoppered, and sent for immediate Gram stain and both aerobic and anaerobic culture. Antibiotic sensitivities are performed if the culture is positive.

Following aspiration, the stoppered tube was transported immediately to the lab, and a lab technician performed the Gram stain and cultures. If the procedure had been performed after hours, the technician was called in to the hospital to perform the examination.

Patients were placed on Cloxacillin 500 mg four times daily for 7 to 10 days following the procedure. In two cases of penicillin allergy, Cephalexin 500 mg four times daily was administered. A cephalosporin antibiotic was chosen as the penicillin allergies documented were

urticarial in nature. Appropriate advice regarding elevation was given to all patients, and splinting was performed when indicated. Analgesics were prescribed when necessary, but no additional medications were administered.

Follow-up appointments to the emergency department were arranged in 48 hours for all patients, with subsequent appointments depending on the clinical response. Clinical response was measured by reduction of swelling, erythema, and local pain, resolution of localized lymphadenitis or lymphadenopathy, and by normalization of skin temperature. Attempts were made to contact patients by phone or letter for patients who did not return for follow-up.

Results

The results for thirty-two patients are displayed in Table I. Nine patients (28%) were lost to follow-up. There were 20 males (62%) and 12 females (37%) in the study group, with an average of 33 years. The distribution of the cellulitis is shown in Table II. Thirteen cases (40%) involved the hand. The distribution of site of cellulitis was approximately evenly divided between the upper body (53%) and the lower body (47%).

Table I: Clinical and Laboratory Results

No.	Age (yr)	Temp. (C)	Site	WBC XI,000	Sex	Associated Injury	Wound Culture	Antibiotic	Outcome
1	29	37.5	Hand	13.5	f	+	–	Cloxacillin	–*
2	19	37.5	Hand	11.4	f	–	–	Cloxacillin	Res.
3	49	37.6	Leg	7.4	m	–	–	Cloxacillin	Res.
4	26	37	Arm	7.8	m	–	–	Cloxacillin	– –
5	34	37	Leg	7.7	f	–	–	Cloxacillin	Admit I.V. Cloxacillin
6	60	36.5	Foot	6.8	f	–	–	Cloxacillin	Admit I.V. Erythromycin
7	34	37.5	Hand	7.1	m	+	–	Cloxacillin	Admit I.V. Cloxacillin
8	19	37	Hand	9.3	m	–	–	Cephalexin	– –
9	24	37.4	Foot	8.6	f	–	–	Cloxacillin	– –
10	38	37	Hand	– –	f	–	–	Cloxacillin	– –
11	60	37	Arm	– –	m	+	–	Cloxacillin	
12	26	37.2	Hand	9.8	m	–	–	Cloxacillin	
13	39	37	Foot	6.5	m	–	–	Cloxacillin	– –
14	26	37	Arm	7.8	m	–	S.Aureus	Cloxacillin	– –
15	65	36.8	Foot	9.5	f	+	C.Welchi	Cloxacillin	Res.
16	36	36.5	Trunk	10.1	m	–	S.Aureus	Cloxacillin	Res.
17	24	36.9	Arm	5.8	m	+	S.Albus S.Pyogenes	Cloxacillin	Res.
18	19	36.7	Leg	6.8	f	–	–	Cloxacillin	Res.
19	47	37	Leg	12.8	m	–	–	Cloxacillin	Res.
20	22	37	Foot	9.9	m	+	–	Cloxacillin	Res.
21	20	37.2	Trunk	8.7	f	+	–	Cloxacillin	Res.
22	58	37.6	Leg	17.2	m	–	–		Admit I.V. Cloxacillin Died of Brain Abscess
23	16	36	Leg	6.8	m	–	–	Cloxacillin	Res.
24	25	37	Hand	11.4	m	+	E.Coli	Admit I.V. Cephalomandole	Incision and Drainage and Cloxacillin
25	19	37	Hand	6.6	f	+	–	Cloxacillin	Res.
26	32	36.6	Leg	6.1	m	–	–	Cloxacillin	Res.
27	70	36.6	Hand	9.0	m	+	S.Aureus	Cloxacillin	Res.
28	39	36.5	Hand	– –	m	+	–	Cloxacillin	Res.
29	28	38	Hand	12.8	m	+	–	Cephalexin	Res.
30	28	37.2	Leg	–	f	+	–	Cloxacillin	Res.
31	36	37	Hand	–	m	+	–	Cloxacillin	Res.
32	16	37	Hand	6.8	m	+	–	Cloxacillin	Res.

– * lost to follow-up
Res. - resolution

Table II: Distribution of Cellulitis

	Number of Cases
Arm	4 (12.5%)
Hand	13 (41%)
Trunk	2 (6%)
Leg	9 (28%)
Foot	4 (12.5%)

Table III: Distribution of Positive Tissue Aspiration Cultures

	Group 1 (associated injury)	Group 2 (no injury)
Total *	4 (26%)	2 (12%)
S. Aureus	1	2
S. Albus	1	
S. Pyogenes	1	
C. Welchi	1	
E. Coli	1	

* The number of aspirates does not total the overall number since two aspirates had multiple pathogens.

The clinical presentation showed marked variation from mild erythema and swelling to marked swelling with lymphadenitis and systemic symptoms. Seven patients were mildly febrile, and four had leukocyte counts greater than 12,000 WBC/mm^3. No patient had a localized abscess.

Patients were subdivided into those with an associated injury, such as a laceration, puncture wound, or burn as a presumed portal of entry, and those without. Sixteen patients (50%) had an associated injury, with males predominating in this group (68%). There was no age difference between the two groups.

The results of aspiration were poor, with six positive results. The organisms cultured are presented in Table III. In cases with an associated injury, a positive culture was found in four cases (26%); in cases without a portal of entry, only two cultures were positive (12%).

All patients except four were started on oral Cloxacillin. Two patients were commenced on oral Cephalexin because of penicillin allergy. One patient had a bite wound of the hand with secondary cellulitis and was admitted to hospital immediately for intravenous Cloxacillin and Cephalomandole, and required surgical incision and drainage. One other patient, an alcoholic, died in hospital from a brain abscess, following admission for a cellulitis of the leg.

Of the nineteen patients who presented for follow-up, sixteen responded, for a rate of 84%. Three patients required subsequent admission for intravenous antibiotics, which was curative. No complications of needle aspiration were reported.

Discussion

Culture rates from wound aspirations in this study was 18%, low in comparison with other studies. Szilagyi et al[9] described an eighty-nine percent culture rate in a group of adult outpatients with an associated portal of entry, and Fleisher et al[10] reported a forty-three percent culture rate for a series of paediatric patients. Ginsberg[11], in a retrospective study of one hundred and eighty-five patients, describes sixteen wound aspirations done with only five positive results. He suggests that variable culture results may be due to the presence of bacteria in the infected tissues only during the first twelve hours of infection, with aspiration following this critical period giving negative results. As time from onset of symptoms to presentation was not recorded in this study, this may be a factor contributing to the low yield.

The role of tissue aspiration in the diagnosis and treatment of cellulitis is not clear. In their original paper, Umin and Kunin[8] describe the use of tissue aspiration in seven cases of cellulitis and show that these cultures were important in subsequent patient management. These patients were all hospitalized, and three had hematological malignancies, in marked contrast to this series.

Despite an attempt to exclude non-infectious inflammatory lesions from this series, it may be that the results reflect the fact that some such lesions were included. Neither the presence of a temperature, nor a leukocyte count over 12,000 WBC/mm^3 correlated with a positive culture; however, there was a higher yield in those patients with an associated injury.

Because the number of positive culture results from aspirations was low, it is difficult to comment on the type of organisms isolated. The presence of Gram-negative and anaerobic bacteria is interesting, and warrants further study. Despite the lack of culture results patients responded well to oral doses of Cloxacillin.

Fleisher[10] and others[12,13] recommended therapy with oral Cephalexin for outpatient therapy for paediatric patients. In the adult population, where the risk of infection with haemophilus influenza is low, it would appear that treatment with a beta-lactamase resistant penicillin is adequate.

Summary

The rate of positive wound aspiration in cellulitis is quite variable and a wide variety of organisms have been cultured. Leukocyte counts and the recording of temperatures do not appear to be helpful in predicting which patients will have positive cultures. Further studies may be helpful in determining the role wound aspiration cultures have in the treatment of cellulitis, and in identifying those patients who can benefit from the procedure.

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The alcoholic patient: toxicologic differential diagnosis

I VICAS MD, CM, FRCP
M TENENBEIN MD, FRCP

Ethanol is the commonest-ingested drug in North America. For the patient presenting with an altered mental status and the obvious odour of alcohol, a broad differential diagnosis must be entertained. Virtually every etiologic group (toxic-metabolic, trauma, infection, vascular and even neoplastic) must be considered. However, here we will review only the toxic-metabolic group of conditions (Table I).

Assuming a stable or stabilized patient, the clinical approach includes a complete history utilizing all available corollary sources, a meticulous physical examination and the following laboratory panel: CBC and differential, serum electrolytes, glucose, BUN, osmolality, arterial blood gasses and urinalysis. The above clinical data may provide a specific diagnosis or suggest the need for further investigations (examples – CT scan, methanol level, etc.).

Osmolal and anion gaps

The calculation of the osmolal and anion gaps helps to narrow the differential diagnosis for this presentation. The principle behind the osmolal gap is to determine the presence of osmotically active solutes that are not normally there. Those osmotically active solutes that are normally present in significant quantities include serum sodium (and an equal amount of anion), BUN and glucose. The calculation (S.I. units) is as follows:

Calculated osmolality = 2Na + BUN + Glucose

Osmolal gap = Measured Osmolality − Calculated Osmolality

A gap greater than 10 is evidence for the presence of a low molecular weight solute or solutes. This might be ethanol, isopropanol, methanol or ethylene glycol.

If metabolic acidosis is present, then the anion gap should be calculated using the following formula:

$$(Na^+ + K^+) - (HCO^-_3 + Cl^-)$$

A gap greater than 15 is evidence for the presence of an abnormal anion or an increased amount of a normally-occurring anion. Etiologies for an elevated anion gap metabolic acidosis are listed in Table II.

TABLE I: Toxicologic differential diagnosis of the alcoholic patient

Acute Ethanol Intoxication
Alcoholic Ketoacidosis
Ethanol Substitutes
Ethanol and Coingestants
Ehtanol – Disulfiram Reaction

TABLE II: Elevated anion gap metabolic acidosis ...

Ingestion of:	Salicylates
	Methanol
	Ethylene Glycol
	Iron
	Isoniazid
	Paraldehyde
	Phenformin
Ketoacidosis (diabetic or alcoholic)	
Lactic acidosis	
Uremia	

Acute ethanol intoxication

The dose-related psychologic and physical manifestations of acute alcohol intoxication are well-known to emergency physicians: varying degrees of exaggerated emotional states, muscular inco-ordination, disordered perception and decreased level of consciousness.

Ethanol is rapidly absorbed from the duodenum, particularly in the fasting state, with peak blood levels reached within an hour or so following ingestion. Ethanol is metabolized by zero-order kinetics (a fixed amount per unit time). A small amount (5%) is excreted un-

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changed through the lungs and kidneys. In general, 1.0 mL/kg body weight of absolute ethanol results in blood levels of 100 mg% (22 mmol/L) in one hour. The lethal dose of alcohol in adults is 5-8 g/kg and 3g/kg in the child. Blood concentrations generally correlate with clinical symptoms. Concentrations below 40 mg% (9 mmol/L) rarely lead to motor or sensory impairment. In non-alcoholics, concentrations of 150 mg% (33 mmol/L) result in slurred speech and moderate motor impairment; 300-500 mg% (65-110 mmol/L) in marked muscular incoordination and stupor; and greater than 500 mg% (110 mmol/L) in coma and respiratory depression.

However, a patient's depressed level of consciousness may not be due to the alcohol that is readily apparent from the obvious odour. If an ethanol level is not available it can be estimated from the osmolal gap. The actual gap represents the blood alcohol concentration in mmol/L or it can be multiplied by 4.6 to give the concentration in mg/dl. If the actual or calculated serum ethanol concentration is too low to account for the clinical picture, then search for an alternate etiology.

The most serious metabolic consequence of acute ethanol intoxication is hypoglycemia with its resultant coma and seizures. Children seem to be more susceptible to the development of hypoglycemia from ethanol. Chronic alcoholics can also become hypoglycemic because of their associated malnutrition and decreased hepatic glycogen stores.

Treatment of acute ethanol intoxication is supportive. Because ethanol is rapidly absorbed, gastrointestinal decontamination procedures are not indicated if it is the sole ingestant. The intravenous infusion of fructose has been shown to accelerate the rate of metabolism of ethanol by 25-30% but is not without risk. It can result in lactic acidosis, hyperuricemia and osmotic diuresis. Considering the relatively small benefits of fructose compared to potentially dangerous side effects, its use is not recommended. Naloxone has been advocated in the treatment of alcoholic coma; however, there are no convincing studies supporting its efficacy.

Alcoholic ketoacidosis

This condition typically occurs in chronic alcoholics over the age of 40. The patient presents with abdominal pain, vomiting and poor oral intake. Frank coma is unusual and other etiologies should be sought. Physical examination usually shows stigmata of chronic alcoholism and perhaps also malnutrition. Tachypnea and tachycardia may also be present. The blood pressure ranges from normal to mild hypotension and the patient may be dehydrated. Hypertension and fever can occur in alcoholic ketoacidosis but usually indicate withdrawal or infection. Symptoms of withdrawal may also be present in the ketoacidotic patient.

Increased anion gap metabolic acidosis is the hallmark of alcoholic ketoacidosis. It is primarily due to the accumulation of the ketoacids, acetoacetate and beta-hydroxybutyrate but lactate and pyruvate may also be elevated. The pH is usually in the 7.15-7.25 range, but can be as low as 6.95. Blood glucose may range from normal to mild or moderate elevation. Urine for ketones may be negative because the nitroprusside reagent in the dipstick does not measure beta-hydroxybutyrate.

Treatment consists of replenishing fluids and carbohydrate stores by glucose-saline containing solutions. Although usually unnecessary, the occasional patient may require modest insulin therapy because of the glucose intolerance that is common to this condition. Parenteral thiamine should be administered early during therapy.

Ethanol substitutes

The alcoholic patient may have deliberately or inadvertantly ingested isopropanol, methanol or ethylene glycol as a substitute for ethanol. Methanol and ethylene glycol poisoning both produce an increased anion gap. Although their levels can be calculated from the osmolal gap the actual level should be measured to guide therapy and to determine if ethanol has been ingested as well. There is a period of latency during which the symptoms are usually only those of intoxication. This interval is due to the relative, slow metabolism of methanol and ethylene glycol by alcohol dehydrogenase to their respective intermediates of formic and glycolic acids. These products are felt to be responsible for the toxicity and the metabolic acidosis. Isopropanol produces a depressed level of consciousness to a greater extent than ethanol. Since it is metabolized to acetone and not to an organic acid, it does not produce an anion gap metabolic acidosis.

Therapy for methanol and ethylene glycol poisoning consists of bicarbonate for the acidosis, ethanol to block the formation of the toxic metabolites and hemodialysis to remove the toxins. Recent evidence supports folate administration as adjunctive therapy. Its potential benefit is on the basis of increasing the rate of metabolism of formic acid to carbon dioxide and water. A therapy of the future may be 4-methyl pyrazole. It inhibits alcohol dehydrogenase therapy preventing the formation of formaldehyde and formic acid. Severe isopropanol poisoning may also require hemodialysis to aid in its excretion.

Ethanol and coingestants

Other drugs are frequently ingested along with ethanol. However, in serious overdose, it is usually the ingestion of the former that becomes the entrance complaint. This does not minimize the need for a meticulous history and physical examination, and for judicious laboratory investigations looking for specific toxins.

Ethanol – disulfiram reaction

This reaction occurs in the patient on chronic disulfiram therapy who ingests ethanol. It consists of skin flushing beginning on the head and neck then progressing to the trunk, associated with some or all of the following: diaphoresis, headache, nausea, vomiting, abdominal pain, chest pain and hypotension. It is generally felt that these symptoms result from accumulation of acetaldehyde secondary to inhibition of aldehyde dehydrogenase by disulfiram.

Symptoms begin 15-30 minutes after the ingestion of even small amounts of ethanol and may last for a few hours. There is little correlation between the amount of ethanol ingested and the severity of symptoms. Therapy is supportive, including monitoring of vital signs, oxygen and intravenous fluids as required. Other previously advocated treatments, such as vitamin C as an antioxidant, have not been shown to be efficacious.

Occasionally a patient may overdose on disulfiram. An acute ingestion of 3.0 g or more may be associated with nausea, vomiting, lethargy, ataxia, seizures and coma. Since ipecac contains alcohol, the preferred method of gastric decontamination is gastric lavage followed by activated charcoal. Therapy is supportive.

Conclusion

The patient presenting to the emergency department with altered mental status and the odour of alcohol may not be simply inebriated. The emergency physician must carefully approach this problem with a high index of suspicion.

Additional Reading:

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Meetings to note

Air Medicine Day 1985

A programme designed for physicians and other health care workers involved in the treatment of patients requiring transport by air. The purpose of the programme is to determine some of the problems unique to this mode of transport, and to offer a forum for discussion.

Date: November 14, 1985

Location: Sunnybrook Medical Centre, Toronto, Ontario

For further information contact:
Dr. J. Crosby
Medical Consultant
Emergency Care Programs
7 Overlea Blvd.
7th Floor
Toronto, Ontario
M4H 1A8

Title: **Recent Advances in Geriatric Medicine**
Transitions in the System of Long Term Care:
The State of the Art

Dates: January 27-29, 1986

Location: U.S. Grant Hotel
San Diego, California

For further information contact:
Office of Continuing Medical Education
UC San Diego
School of Medicine, M-017
La Jolla, CA 92093
Phone: (619) 452-3940

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— Dr. Kevin Dwyer,
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for further information.

Information for Authors

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The CAEP Review invites authors to contribute appropriate manuscripts for publication on topics relevant to the practice of Emergency Medicine and the organization of Emergency Medical Services. Manuscripts and other communications should be addressed to the Editor, CAEP Review, care of Department of Emergency Services, Sunnybrook Medical Centre, 2075 Bayview Avenue, Toronto, Ontario; M4N 3M5. A covering letter should accompany submissions indicating the principal author with whom the negotiations can be undertaken regarding any revisions that are seen to be necessary prior to publication. The letter should also specify whether or not the material has been submitted to any other periodicals for consideration for publication.

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The CAEP Review adheres to the requirements for manuscripts submitted to biomedical journals as contained in the declaration of Vancouver of January 25th, 1978.*

Manuscripts should be typed, double spaced including the title page, abstract, text, acknowledgements, references, tables and legends and illustrations. Each component of the manuscript should begin on a new page. Authors should keep copies of everything submitted.

Title Page The title page should include the title of the article which ought to be concise and informative. The title should be amenable to indexing. The title page should also contain the full name, academic degrees, and affiliations of each author. The title page should include the name of any organization sponsoring an assembly or meeting in which the article may have been originally presented. If the research has been supported by grants, such financial support should be acknowledged on the title page. Finally, the title page should also contain the address for reprint requests.

Abstracts All original contributions and review articles should be preceded by an abstract, typed, double-spaced on a second page following the title page. The abstract should be no more than 150 words, stating the purpose of the study, basic procedures involved, principal findings including statistical significance, and principal conclusion drawn. Abbreviations or symbols should be avoided wherever possible. Below the abstract up to 10 key words or short phrases should be provided which will assist indexers in cross-indexing articles.

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Results The results of experiment should be presented in a logical sequence in the text with tables, illustrations, graphs, etc. to clarify important results or observations.

Discussion The discussion of the findings should relate the observations to other relevant studies. It should emphasize new and important aspects of the study and conclusions. The discussion section should not comprise an exhaustive literature review.

Acknowledgement Persons who have made a substantial contribution to the study, yet who are not listed as authors may be acknowledged.

References References should be listed in the form as adopted by Index Medicus and the National Library of Medicine in United States. All authors should be listed in studies with three or fewer names. Otherwise, the first three names only should be listed. Journal name should be abbreviated again according to the style in the Index Medicus. The title of the article should be included.

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The Review will consider material other than original experimental work. In particular, the Review will from time-to-time publish review articles from experts in the field who have conducted a thorough literature search. Papers submitted of this nature should comprise of extensive literature reviews on a narrow clinical topic, well-referenced, and of significant relevance to the clinical practice of Emergency Medicine.

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*These requirements known as the Declaration of Vancouver were agreed upon at that city on January 25th, 1978. Members of the International Steering Committee included J.F. Murray, M.D. (Chairman); E.G. Huth, M.D.; S. Lock, M.A.M.B.; W.R. Barclay, M.D.; S. Crawford, Ph.D.; R.W. Mayo; H.R. Meiss; I. Munroe, M.D.; F.H. Porcher, M.A.; A.S. Relman, M.D.; D.A.E. Shephard, M.B.; T. Southgate, M.D. Enquiries regarding the Declaration should be sent to Dr. E.J. Huth, Annals of Internal Medicine, 4200 Pine Street, Philadelphia, PA 10904 U.S.A.

Problems of Consent in the Emergency Department

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JOAN M. GILMOUR LLB

One of the frequently encountered medical-legal issues in the Emergency Department is that of consent. The intent of this article is to give a general introduction to the law, and to identify some of the problems which can occur related to the issue of consent. An attempt will be made to discuss the issues raised by particular patient problems, but not to give definitive answers. As changing a situation only slightly may lead to a different outcome, and variations exist in provincial legislation, it is recommended that counsel be sought for specific questions related to an individual case.

Introduction

Our law comes from two main sources: previously determined cases and legal theories developed from them, and legislation. Civil actions are disputes in the private sector between individuals or corporations, while criminal proceedings are in the public sphere, and are the prosecution of offences as defined by statute. Although a trier of fact (either judge or jury) decides the case in both instances, in criminal proceedings guilt must be proven beyond a reasonable doubt, while in civil actions, the person suing (the plaintiff) need only prove his case on the balance of probabilities in order to succeed. The burden of proof rests with the person bringing the matter to court. For some acts or omissions, a person may be charged criminally and be sued civilly.[1]

Although on occasion a physician may be charged with a criminal offence, most court proceedings against physicians are civil actions, in which it is alleged that the physician committed a wrong, or tort. A tort is a breach of a duty, imposed by law, owed by one person to others. The breach of the duty must result in damage, and the harm done must be one that can be compensated in a civil action — i.e. by compelling the wrong-doer to pay for the damage he has done.

Torts are divided into two broad categories, depending on whether the wrongful act was intentional or unintentional. The relevant intentional torts in a medical context are: *battery*, the intentional touching of another person without consent; *assault*, the intentional placing of another person in apprehension of battery; and, *false imprisonment*, the unlawful restraint or detention of a person. Negligence (malpractice) is an unintentional tort. Canadian and British cases define negligence as the omission to do something which the reasonable person, guided by the considerations which ordinarily regulate human affairs, would do, or the doing of something which a reasonable and prudent person would not do.[2]

A physician is viewed as a resonable and prudent person with special training, and is held to that standard of care. The standards are objective. Specialists must display a higher degree of skill and care than general practitioners — the standard is that of the average specialist in the field — while an intern, if he identifies himself as such, may in certain circumstances be held to a somewhat lower standard. Incompetence, however, will not be excused. Not every error of judgement or incorrect choice of treatment will be held to be negligent — the error must be one that results in the diagnosis, treatment, or management of the patient falling below the standard of care reasonably to be expected.

In order to prove negligence, four elements must be present. A duty of care must exist; there must be a breach of that duty as measured by relevant standards of care; the plaintiff must have suffered some loss or injury; and the injury must have arisen as a reasonably foreseeable result of the negligence of the defendant (causation).[3]

Consent to Medical Treatment

Consent is the expressed willingness that an act occur, and can be implied or expressed verbally or in writing, all equally valid. A witness is not required. Consent in law has traditionally served as a defence against allegations of assault and battery. Where an action is framed in battery, it is sufficient for the plaintiff merely to establish the touching by the physician, who may be found liable for damages flowing from the results of the procedure if there was not consent. This is true even if the damages were not foreseeable, and even if what was done did not fall below the standard of care required. This differs from negligence, where the plaintiff has the burden of establishing the relevant standard of care, and its breach. Recently Canadian courts have characterized a physician's failure to obtain a proper informed consent as negligence.

The issue of consent is not always well defined, as the following cases illustrate.

Case I: A 46 year old male is transferred to your hospital from another centre. The patient was jogging, and was struck by a truck. Injuries determined at the sending facility included a closed head injury, multiple rib fractures, an unstable pelvic fracture, and a knee injury. Initial vital signs were a BP of 80/−, pulse of 120, and respiratory rate of 30. Crystalloid has been administered prior to his arrival at your hospital. On arrival at your facility, the patient is mildly confused, hypotensive, and has a hemoglobin of 60.

The patient is a Jehovah's Witness, and carries a card in his pocket stating that he refuses all blood products. When asked regarding this point, the patient now states that he agrees to transfusion. Although disoriented, the patient appears to understand the question, and its implications.

The patient's wife arrives in the Department, learns of her husband's condition and his statement regarding accepting a transfusion, refuses to allow the administration of any blood products, signs a release of liability form, and insists that the patient be transferred to another hospital.

Is this a true emergency?

Does the wife's refusal and demands change your management of the case?

Given that you contact both the hospital lawyer, and the CMPA, and receive contradictory advice from them, with the hospital lawyer refusing to accept any responsibility for your actions, and the CMPA suggesting that the court case arising will be of interest to them, do you transfuse the patient?

Case II: A 29 year old lawyer took an overdose of an unspecified amount of valium as a suicide attempt in response to his wife's request for a separation. He was brought to the Emergency Department by an ambulance, called for by his wife. In addition to the valium, he had consumed an unknown quantity of alcohol and cocaine. There is no past history of suicide attempt, and the patient is under the care of a phychiatrist.

On arrival the patient is alert and assertive. He refuses to have his stomach emptied by either lavage or emesis, stating that he is aware of his rights. He agrees to remain in the Deparment for observation.

Should this patient be made an involuntary admission, and if so, treated?

Can you treat this patient without his consent?

If his wife arrives, and consents to treatment, does this help?

Case III: A 15 year old girl comes to the Emergency Department seeking the "morning after pill" for a contraception failure. She clearly understands the treatment alternatives and consequences. She will not allow you to contact her parents.

Is she capable of consent?

Should you contact her parents?

Can consent be obtained for an illegal treatment?

If you consider the treatment experimental, can the patient consent?

What disclosures are necessary?

A number of issues are raised by these examples which are of particular interest in the Emergency Department.

Emergency Treatment

A physician can intervene without a consent in a life threatening situation. Treatment should not be delayed to obtain a consent; failure to act could constitute negligence. Despite these statements, without a court order, a physician cannot treat in an emergency in the face of a refusal of treatment by a competent patient. It would also appear that a patient refusing treatment cannot be treated as an emergency after losing consciousness, without having given a consent to allow this.

A court may make an order authorizing treatment if the patient has infant dependents, or to protect the hospital and/or physician from liability. With the passage of the Canadian Charter of Rights and Freedoms, an individual's right to self-determination, including the right to make choices objectively "harmful" to oneself, has likely been strengthened, and courts may be even less willing to interfere with such choices. This issue has not yet been considered in sufficient detail by Canadian courts to be sure of the interpretation the Charter will be given. A minor can be made a ward of the Children's Aid Society by court order, and the Society can then consent to treatment.

Minors

Parental consent is usually required for non-emergency care of minors on the theory that a minor does not have the capacity to give an informed, voluntary consent. There is uncertainty as to the age of consent and it may be before the age of majority — 18 in the province of Ontario. Regulations made under the Ontario Public Hospitals Act set the age of consent for surgical operations, diagnostic tests and medical treatment procedures performed in a hospital at 16, and impose no minimum age at which consent can be given if the patient is married. If the patient is under 16 and unmarried, parental consent must be obtained.[4] Emancipated minors are independent of parental authority by marriage or living arrangements, and it is generally felt they can give consent. At common law, a minor can give a legally effective consent if he or she has the capacity to understand the nature and consequences of the treatment, including the potential risks and benefits, and to arrive at a reasoned decision whether to accept or reject the proposed treatment.

When the treatment will not and cannot benefit the minor, physicians should not proceed without a court order, even if the parents consent (organ donations between siblings are a prime example of this). Once a minor's consent is obtained and can be accepted, no consent or refusal by the parents can be valid. The possibility of disciplinary proceedings remains for treating minors without parental consent.

Mental Competence

A patient can be assumed to be legally competent unless declared incompetent by a court, with a guardian or committee of the person being appointed. Application can be made under provincial incompetency legislation where necessary. This differs from mental competence, which depends on the mental state of the individual at the time of the proposed treatment. Where competence could be an issue later, the physician should be sure, at the time, to document his conclusions as to competence and his reasons. Again, it is the ability to understand the nature and consequences of the treatment including potential risks and benefits which determine the ability to consent. The psychiatric patient's ability to comprehend the proposed treatment must be considered — an involuntary patient in a psychiatric hospital is not assumed by the law to be incompetent to consent to treatment by virtue of his committal alone.[5]

In the case of mental incompetence, whether transient, due to intoxication or medications, or more permanent, a substituted consent from a relative (spouse, parent, child, sibling) should be obtained. Some jurisdictions make specific provision by statute for such substitute consent. There is no clear law in Ontario on the validity of a substitute consent, but it is some protection from being sued by a relative.

Informed Consent

The doctrine referred to as informed consent relates to the nature, amount, and quality of information disclosed to a patient. The physician's duty to inform extends not just to an explanation of the proposed procedure, but also to the disclosure of associated material risks, including special or unusual risks. Materiality can be a function of the gravity of the consequence, such that disclosure must be made of a very serious potential consequence, even if it is quite unlikely to occur. If the patient's psychological state demands discretion, the procedure and the physician's opinion that full disclosure ought not be made to the patient himself should be discussed with a relative. The responsibility for obtaining consent rests with the attending physician. A failure to disclose the collateral risks may be a failure in the duty owed by a reasonable physician to his patient, and may constitute negligence. The patient would have to prove that the condition resulting was a risk of the procedure, that it was the physician's duty to inform him of that risk, and that a causal link can be established between the risk and the injury, in that the patient would have refused the operation or procedure had he been informed of the risk. In practice, it is the last of these requirements that has been most difficult for the plaintiff/patient to meet in actions against physicians.[6]

The Supreme Court of Canada set these standards for disclosure in a case known as *Reibl v. Hughes*[7]. The plaintiff in that case complained of severe headaches, and was referred to a neurosurgeon who discovered occlusion of the left internal carotid artery. He recommended surgery, though not to relieve the headaches. Through no fault of the surgeon, the patient suffered a stroke as a result of the surgery. The risks attendant to this procedure, as established by medical experts, included this possibility. It had not been disclosed to the patient. In finding negligence, the court held that the test that should be applied was whether a reasonable man in the patient's position would have withheld consent if the required disclosure was made. The defendant physician was held to have failed in his duty to make adequate disclosure to the patient, and was found liable.

Experimentation

For experimental procedures, informed consent requires greater disclosure. Any new or experimental procedure or treatment imposes on the physician a higher standard of care, especially if the patient receives no therapeutic benefit at all. Consent must be free and voluntary after full disclosure of the procedure and all risks, whether material or not, and is best obtained by another physician not involved in the experiment.

The Consent Process

It has been said that "consent is not a document, but a process that culminates in the parties agreeing to the permissible scope of a diagnostic, medical or surgical procedure."[8] The following elements must be present in order for a consent to be legally effective:

1. A voluntary atmosphere should exist, with the patient able to refuse, and without the influence of medications.
2. The legal and mental competence of the patient should be established.
3. An adequate disclosure of the information should involve:[8]
   a) The nature and purpose of the proposed procedure
   b) The probable risks and benefits including serious injury or death
   c) reasonable alternative treatment and the risks associated
   d) the risk of foregoing all investigation and treatment
   e) the length of time the treatment can be postponed and the risks
   f) the probable length of time before returning to regular activities
   g) the probable need for follow-up or additional treatment
   h) the right of the patient to withdraw consent at any time
4. Interpreters should be used where necessary and discussion should be at a level appropriate to the patient with clear replies to the patient's questions.
5. Consent should be specific to the procedure to be performed, not generally worded consent forms.
6. The consent should be documented. A written consent is required in Ontario for surgical procedures in Hospitals. Statutory requirements for written consent vary from province to province.

Conclusion

Problems will still arise concerning the issue of consent in the Emergency Department, and appropriate advice with individual cases is essential. Despite this statement, a more thorough understanding of the purpose and process of consent and adherence to the recommended guidelines, should eliminate many of the problems in this area that are faced on a daily basis.

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