Readmission to intensive care: a review of the literature

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Abstract

Acutely ill patients are commonly found on general hospital wards; some of these are patients who have been recently discharged from an intensive care unit (ICU). These patients may require a higher level of care than other ward patients and, due to the acuity of their illness, are at risk of readmission to ICU. Research has indicated that patients readmitted to ICU have mortality rates up to six times higher than those not readmitted and are eleven times more likely to die in hospital. Numerous studies have retrospectively examined these readmissions but, despite this, there is still no clear indication of why ICU readmissions occur or what the common characteristics of readmitted patients are. This literature review examines the published studies on patients who have been readmitted to ICU. Further research is needed to explore why readmissions to ICU occur and the type of patient who is at greatest risk for readmission.

Introduction

Many patients admitted to general hospital wards are acutely unwell; some will continue to deteriorate despite being in the hospital environment. Research [1-3] has shown that patients' physiological deterioration is often not recognised by clinicians and that many cardiac arrests are actually preventable [4, 5].

A variety of interventions and educational strategies have been initiated to help identify acutely ill patients or those at risk of becoming acutely ill on general wards. Some of these strategies include the medical emergency team [6], patient at risk team [7], modified early warning scores [8], intensive care unit (ICU) liaison nurses [9], critical care outreach teams [10] and acute life-threatening events recognition and treatment courses [11]. These strategies are also designed to help ward staff provide the care these patients require and identify those patients who require a higher level of care (such as admission to a critical care unit), with the ultimate goal of improving the patient's outcome.

Many patients who are at risk of acute deterioration may have had a recent admission to an ICU. Even though these patients have overcome the acute phase of their illness and no longer require the services of an ICU, they may still be 'highly dependent' or require a 'higher level' of care than other patients in the general ward environment. As general hospital wards are not resourced to provide care for highly dependent patients, these patients are at risk of being readmitted to the ICU. Identification of these patients allows them to be 'targeted', ensuring they receive the care they need, that wards are resourced to provide such care and that any deterioration in the patient's condition is detected and treated early.

The aim of this literature review, therefore, is to examine the published studies on patients who have been readmitted to ICU in order to:

- Determine the frequency of readmissions.
- Identify the risk factors for readmission.
- Determine the reasons for readmission or the common 'type' of patient readmitted.
- Highlight areas for further research.

Search strategy

The following databases were used to locate published data: Medline (1966-present), CINAHL (1982-present), Synergy, Science Direct, Proquest and Taylor & Francis. The search terms used were 'intensive or critical care', 'recidivism' 'patient follow-up', 'readmission' and 'bounce back'. Discipline-specific journals (e.g. *American Journal of Critical Care*, *Heart & Lung*, *Intensive and Critical Care Nursing*) were hand searched to find studies not catalogued in electronic databases. The worldwide web was also searched using three search engines (yahoo.com, scholar.google.com and askjeeves.com). Exclusion criteria included non-research based articles, those not published in the English language and articles relating to the readmission of patients to hospital from the community.

These search strategies identified a total of 20 studies specifically relating to the readmission of patients to ICU (Table 1). The reference lists of these articles were also perused for further unidentified studies. Year of publication was not used as an exclusion criteria in order to help determine the longevity of the readmission problem and to ascertain if the causes of readmission had changed over time.

The majority of the studies identified were conducted in hospitals in the United States. Two were conducted in Canada and two in Australia. Single studies were also conducted in hospitals in the United Kingdom, Korea, Saudi Arabia, India, Austria and Israel. The majority of the hospitals were large, tertiary referral

hospitals and the types of ICUs included were general, medical, surgical, cardiac, trauma, neurological and some mixed. Two of the studies included data collated from a large number of ICUs in different hospitals; 30 ICUs [15] and 38 ICUs [23]. Few studies reported the number of beds in the hospital or the actual ICU. Limited information was provided on patient demographics such as age or length of stay.

Defining the problem

Before the literature could be reviewed, a decision had to be made about what constitutes a readmission, as a number of definitions could apply. For example, a patient who is admitted to ICU electively on two occasions, for the first and second stages of a major operation, could be considered a 'routine elective admission'. At least one study included this type of patient [29]. There is also the problem of time between initial ICU discharge and readmission to ICU; one study purely focused on patients readmitted to ICU within 48 hours of discharge [17]. There is also the problem of the admission diagnosis. If a patient is readmitted to ICU with a completely different problem to that which caused the first admission, the readmission 'label' could be challenged.

Obviously these definitions greatly impact on the type of patient included in a literature review. For this reason, this review was guided by how readmission was most commonly defined in the literature which, for the majority of studies, was 'a second admission to ICU during the same hospitalisation'. This is the same definition used by the Australian and New Zealand Intensive Care Society [32].

This broad definition, however, is problematic when comparing studies. Some authors [29, 31] recognised this problem and addressed it by dividing readmissions into three groups: those who were readmitted with the same problem; those that were readmitted with a new complication; and those that were undetermined. Unfortunately, not all of the published studies did this. It is acknowledged that this is a limitation of the published studies and thus this literature review.

Results

What percentage of patients are readmitted to ICU?

Readmission rates varied considerably across the 20 studies; the lowest rate was 0.89% [17] and the highest 19% [21], the average being 7.78%. If all the readmission rates are plotted in the order they were published (from 1983 to 2005), no distinct pattern emerges. In other words, readmission rates have not progressively dropped with time, despite advances in health care. If the readmission rates are grouped according to type of ICU (e.g. general, medical, surgical, cardiac), there is also no distinct pattern. Unfortunately, not all studies indicated the characteristics of the study hospital (e.g. tertiary vs non-tertiary, private vs public), limiting further analysis.

ICU readmission rates may be useful when considering the quality of care provided or continuity of care. One author [33], however, highlighted the importance of taking into account the nature or cause of the readmission, citing the example of a post-operative wound infection, which may reflect poor surgical technique rather than inadequate care in the ICU. Variables such as these need to be considered when the readmission rates of different ICUs are compared. Although the average readmission rate of 7.78% could be considered low, it would actually be high if many of these readmissions are preventable.

What are the risk factors for readmission to ICU?

The potential risk factors for readmission to ICU cited in the literature are numerous and varied. Some risk factors (e.g. presence of sepsis, liver failure) were identified by only one study [22], whilst other factors were cited a number of times. For example, the presence of renal or gastrointestinal disease was cited by four studies reviewed [15, 18, 21, 26]. This is interesting given that many patients are admitted to ICU for cardiovascular and/or respiratory support, regardless of the underlying disease process. Whilst these diseases 'by themselves' may not cause a readmission, they may reflect the poor long-term health of the patient. One study [23] identified the presence of severe co-morbid conditions as a risk factor for readmission to ICU, as was higher severity of illness on primary admission [22, 26]. Furthermore, if these diseases are chronic, their combination with an acute illness may exacerbate them.

Premature discharge from ICU was speculated as being a risk factor for ICU readmission, though how this was determined and defined was not actually stated [17, 27, 30, 31]. Being older (e.g. greater than 70 years of age) was found to be a common characteristic amongst those readmitted, and was also speculated to be a risk factor [15, 19, 21, 23]. It is noteworthy that this risk factor was only identified by studies published in recent years. It could be hypothesised that, because of advances in health care, patients who would have once died are now surviving.

Cardiovascular surgery and abdominal surgery were speculated as being risk factors, though only by one study [15], as was urgency of surgery [20]. Again, this may reflect the acute nature of the patient's condition at time of initial ICU admission. Other factors speculated to be risk factors for readmission included longer primary ICU stay [23, 24, 26, 27]; being mechanically ventilated for more than 24 hours [18]; short time from extubation to ICU discharge [15]; and high respiratory or heart rates or high oxygen requirements at time of ICU discharge [20, 28].

A cautionary point must be made when interpreting this information. Few studies actually described how they determined what a risk factor actually was. For example, if an ICU has many readmissions due to pneumonia, this disease process might be labelled a risk factor for readmission. But the pneumonia might have developed because of a breakdown in continuity of care between the ICU and the ward, due to poor documentation for example. Or the pneumonia might have developed because of a patient with a primary respiratory problem being discharged from ICU to a ward ill-equipped to provide the respiratory care needed. This problem could develop because of a shortage of hospital beds or staff.

Risk factors for ICU readmission therefore need to be interpreted carefully, as the medical diagnosis on readmission may not clearly reflect the reasons responsible for the readmission. Furthermore, although many studies labelled certain variables as being risk factors, most of these were identified simply because they were common characteristics of readmitted patients. No study empirically tested variables which were hypothesised as being risk factors for ICU readmission.

What are the causes of readmission to ICU?

Before the causes of ICU readmission can be identified, a definition of 'ICU readmission' needs to be clearly articulated. Every study reviewed cited the pathophysiological processes (or medical diagnosis) of patients who were readmitted to ICU. Examination of the disease process, however, does not necessarily provide insight into why the patient deteriorated and was readmitted. For example, whilst respiratory arrest and thus the need for mechanical ventilation might be a reason for admission (or readmission) to ICU, the cause of the respiratory arrest might not be so obvious. Any number of pathophysiological or 'situational' factors could have contributed. This is one area where the published studies are lacking; the nature or cause of ICU readmissions are commonly cited, but the underlying reasons for the patients' deterioration are not.

One study, for example, found that examining the disease process of patients was not particularly helpful for predicting readmissions[22]. However, cardiac, cardiovascular and/or respiratory disease were by far the most common disease processes present in those readmitted to ICU, and were cited by the majority of studies reviewed. Specific examples of these included respiratory failure, pneumonia, arrhythmia or cardiac arrest. Again, this is not surprising, given that most patients admitted to ICU require cardiovascular and/or respiratory support. Disease of the renal, neurological and gastrointestinal systems were also cited, as were recurrence of the initial problem, sepsis, failure to respond to treatment[22], drug toxicity[31] and transplant rejection[21]. Clearly no single disease process is responsible for the readmission of patients to ICU or present in all of those readmitted.

Some studies provided information on whether readmissions were due to the development of a new problem or the original one [15, 23, 31]. Of the readmissions classified this way, 19-53% were due to the original problem[31] and 28-38% were due to a new problem[29, 31]. Again, this raises the question of whether a second admission to ICU for a 'new' problem should be labelled a readmission.

Only a few studies provided specific insight (or 'underlying reasons') into why patients were readmitted to ICU. These included a delay in initiating respiratory care on the ward[17], inadequate chest physiotherapy on the wards[30] and inadequate 'follow up' care on the ward[25]. These factors strongly suggest that many patients discharged from ICU to general wards are not receiving the care they need; however, this is not necessarily the fault of the staff on the ward. There are many factors influencing the care patients discharged from ICU receive on general hospital wards.

Research limitations

One of the major limitations of the studies examining readmissions is their methodology. The majority of the published studies performed retrospective reviews of the patients' medical records, using them as a source of data. This methodology is problematic, as the nature of documentation in medical records has been shown to be subjective, vague, ambiguous, haphazard or inconclusive by a number of studies[34-36].

Documentation in patients' notes is often performed retrospectively rather than contemporaneously, relying heavily upon the clinicians' memory for accuracy of events. In terms of using medical records as a source of research data, one study demonstrated that only 8% of 125 published studies reviewed actually addressed the interrater reliability of those performing the review[37]. Thus there was little known about the consistency between those people who were reviewing the medical records. This issue was addressed inconsistently by the studies on ICU readmission.

As such, conclusions drawn may be based on unreliable data. None of the studies reviewed asked the clinicians involved their opinions on why patients were readmitted. None asked the ICU staff about why patients may be discharged prematurely. None of the studies reviewed asked the ward staff if they felt adequately supported or equipped to provide the care these patients required. These are all areas requiring further research.

Summary

The published studies indicate that the average readmission rate for patients discharged from ICU is 7.78%. This rate has changed little over the last 20 years, despite advances in health care. The readmission rate does not vary between different types of ICUs and the most common pathophysiological reasons for readmission are cardiorespiratory in nature, though many disease processes can contribute.

Despite what clinicians might think or report anecdotally, there is no 'typical picture' of a readmitted patient. Factors such as age or initial ICU length of stay may contribute, for example, but they are not the typical or common scenario reported in the literature. None of the published studies have been able to clearly identify why readmissions occur, or even agree on what a readmission actually is. Whilst the research reports that cardiorespiratory problems are present in 75% of patients readmitted to ICU, a wide variety of other disease processes affecting numerous body systems are also present.

Although the majority of the studies used similar or identical methodologies, the lack of agreement about what constitutes a readmission and the lack of specific information about the wards or ICUs studied, makes comparison of the findings problematic. The studies reviewed, however, raise many questions about the nature of readmissions. For example, some of the research[29] found that patients retrospectively exhibited 'warning signs' (e.g. fever, low urine output) prior to initial discharge from ICU. Few of these studies commented on whether these signs were recognised or enacted upon by clinicians; this could be a factor contributing to the readmission of patients. This also raises questions about

Table 1. Summary of studies.

Author	Country	Study design	Sample	Main results
Paratz et al.[12]	Australia	Case-control study comparing readmitted patients with patients admitted for same diagnostic criteria	All patients (n = 74) readmitted to ICU in a 12 month period	Readmission rate 7.7%. Common reasons for readmission were respiratory, cardiovascular and neurologic problems
Yoon et al.[13]	Korea	A study group whose ICU discharge was directed by intensivists. A control group (whose data were retrospectively extracted from their medical records) who did not have intensivists actively involved in their ICU discharge	1,929 patients admitted to two medical-surgical ICUs	Readmission rate of the study group was 3.9% and 6.5% for the control group. The common reasons for readmission (both groups) were respiratory disease, postoperative complications, sepsis and cardiac problems. Readmitted patients stayed on average three to four times longer in ICU than those not readmitted
Turkistani[14]	Saudi Arabia	Retrospective review of patients' medical records	All patients (n=27) readmitted to a surgical ICU in a 3 year period	Readmission rate 2.6%. Most common reason for readmission was respiratory problems. Mortality rate of readmitted patients was 37%
Metnitz et al.[15]	Austria	Prospective analysis of ICU admissions and readmissions	All patients (n=19,040) admitted to 30 ICUs during a 2 year period	Readmission rate 5.1%. Readmitted patients had higher severity of illness and more organ failures on first admission to ICU. They also required a significantly higher level of care during their first ICU admission and significantly more 'organ support'
Amin et al.[16]	India	Prospective analysis of ICU admissions	All patients (n=1,190) admitted to a surgical ICU during a 12 month and a 15 month period	Readmission rate 8.7%. Common causes of readmission were respiratory problems, gastrointestinal problems and sepsis. Readmitted patients were sicker, had longer stays in ICU and higher mortality rates (34% vs 17%), than those not readmitted
Nishi et al.[17]	USA	Retrospective review of patients' medical records	10,840 patients admitted to a surgical ICU	Readmission rate 0.89%. Common causes of readmission were respiratory, neurologic and cardiac problems. 21.8% of readmissions were deemed preventable 'if certain treatment or actions had been applied' whilst the patient was on a general ward
Bardell et al.[18]	Canada	Retrospective review of patients' medical records	2,117 patients admitted to ICU post cardiac surgery	Readmission rate 3.6%. The majority of patients were readmitted for cardiac or respiratory problems. Those readmitted had a much higher mortality rates than patients not readmitted (17% vs 2.8%)
Kogan et al.[19]	Israel	Prospective observational study of ICU admissions	1,613 patients 'fast-track' discharged from ICU post cardiac surgery	Readmission rate 3.29%. The majority of readmissions were due to respiratory problems or atrial fibrillation. Those readmitted had a 'significantly prolonged' second ICU stay compared with their initial ICU stay.
Chung et al.[20]	UK	Retrospective review of patients' medical records and a comparison of the readmitted patients with a 'matched' cohort	All patients (n=1,745) admitted to cardiac surgical ICU in a 12 month period	Readmission rate 3.7%. The most common reasons for readmission were renal failure, respiratory failure and cardiac arrest. The strongest predictors for readmission were non-elective (i.e. emergency) surgery and higher oxygen requirements upon discharge from ICU. The mortality rate of those patients readmitted was 30%, whilst none of the patients in the matched cohort died.
Levy et al.[21]	USA	Retrospective review of patient database and the medical records of 23 patients readmitted to ICU	1,197 patients admitted to an ICU post liver transplant	Readmission rate 19%. The main cause of readmission was cardiopulmonary dysfunction, though other medical problems were often present. Significant predictors of readmission were the patient's age, preoperative blood results and the amount of blood products administered intra-operatively.

Author	Country	Study design	Sample	Main results
Rosenberg et al. [22]	USA	Retrospective review of patients' medical records	Consecutive (n=4,684) admissions to a medical ICU during a 4.3 year period	Readmission rate 9.6%. The main causes of readmission included upper gastrointestinal bleeding, pneumonia, respiratory failure and sepsis. Readmitted patients had significantly more co-morbidities and were also sicker and more physiological unstable at the time of first ICU admission and discharge. Readmitted patients were 11 times more likely to die in hospital and have hospital stays almost twice as long as those not readmitted
Cooper et al. [23]	USA	Retrospective review of patient database	Admissions (n=13,6419) to 38 ICUs in 28 hospitals during a 4 year period	Readmission rate 6%. Readmitted patients had mortality rates six times higher than those not readmitted. They also had a greater severity of illness on readmission compared with their primary ICU admission
Cohn et al. [24]	USA	Retrospective review of patient database and ICU discharge summaries	2,228 patients admitted to ICU post cardiac surgery	Readmission rate 3.9-9.2%. The majority of readmissions were due to respiratory problems such as refractory hypoxia, hypercarbia and respiratory distress. Initial ICU length of stay was longer in those readmitted than those not readmitted
Russell [25]	Australia	Retrospective review of patients' medical records	572 patients admitted to a medical-surgical ICU during a 6 month period	Readmission rate 10.5%. The majority of readmissions were due to cardiac or respiratory problems.
Chen et al. [26]	Canada	Retrospective review of patient database	5,127 patients discharged from seven medical-surgical ICUs	Readmission rate 4.3%. The most common reasons for readmission were cardiovascular and respiratory problems. Readmitted patients were sicker on initial ICU admission, had longer length of ICU stay and higher mortality rates than those who did not require readmission
Durbin & Kopel [27]	USA	Retrospective case-control chart review	1,803 patients discharged from a medical and a surgical ICU	Readmission rate 4.6%. The main causes of readmission were respiratory, neurological and cardiac problems. The mortality rate was nearly six times higher in readmitted patients and their length of first ICU stay and hospital stay were more than double those not readmitted
Rubins & Moskowitz [28]	USA	Prospective analysis of ICU admissions	Consecutive (n=300) admissions to a medical ICU	Readmission rate 16%. Cardiac disease and respiratory insufficiency were the diagnoses on readmission for 50% of patients
Snow et al. [29]	USA	Retrospective review of patients' medical records	721 patients admitted to a surgical ICU during a 12 month period	Readmission rate 9.4%. Respiratory and central nervous system disorders were the most common reasons for readmission. Of the patients readmitted, 62% demonstrated (retrospectively) one or more warning signs of potential organ dysfunction and 50% were readmitted for a problem related to these warning signs. Approximately one quarter of the readmitted patients in this study died, which was more than three times the reported ICU mortality rate.
Baigelman et al. [30]	USA	Retrospective review of patients' medical records	All patients (n=1,069) admitted to critical care units of one hospital during a calendar year	Readmission rate 11.7%. Common causes of readmission were cardiac and respiratory problems. A lack of pulmonary care contributed to the readmission of some patients.
Franklin & Jackson [31]	USA	Retrospective review of patients' medical records	512 admissions to a medical ICU during a 12 month period	Readmission rate 12%. Mortality rate of readmitted patients was 58%, more than twice the overall ICU mortality rate. Common causes of readmission were sepsis, gastrointestinal haemorrhage, drug toxicity and respiratory failure.

the ICU discharge process, including what actually determines if or when a patient will be discharged from ICU and what, if any, 'follow up' the patient receives. Certainly the issue of premature discharge has been highlighted by the research, but what it actually constitutes is yet to be defined.

What is an ICU 'readmission'?

Readmission, simply defined, means 'being admitted again'; this can, of course, mean being admitted to ICU for the second, third, fourth or umpteenth time. However, the definition currently used by published studies makes it difficult to assess the efficacy or performance of individual ICUs or hospitals, or compare the performance of different ICUs. Readmissions to ICU should be considered a significant problem if the second admission could have been prevented, particularly given the current international shortage of ICU beds and the high cost of intensive care.

Numerous studies, for example, have shown that up to two thirds of patients exhibit signs of deterioration prior to cardiac arrest and that this deterioration is noticed or documented by ward staff [1, 38-40]. Despite staff noticing this, these patients still suffer a cardiac arrest. Whilst some of these arrests reflect the 'natural progression' of a patient's illness, these studies speculated that many of these arrests were avoidable with better patient care. It is these patients whose care has been less than ideal that should be labelled a readmission, as more timely or adequate care may have prevented their deterioration and thus readmission to ICU.

If the second admission to ICU could not have been prevented or predicted, then it should not be labelled a readmission. This would 'eliminate from the data' those patients who are being readmitted to ICU electively for the second stage of a surgical procedure for example. Similarly, if the readmission is not related to the primary admission, then it should not be labelled a readmission. This would eliminate many patients who are readmitted to ICU a number of weeks after their primary admission but for a 'new problem'.

Furthermore, patients who have a second admission to ICU purely due to a progression of their disease should not be included in data on readmissions, as their quality of care did not contribute to the readmission. To label these patients as a readmission does nothing more than create misleading data. An example of the type of patient who should be included in data on readmissions is one who was initially discharged from ICU prematurely due to a shortage of beds. Such a patient would still require intensive care, which hospital wards are not resourced to provide. This reflects a breakdown in quality of care.

One author [33] questioned how useful ICU readmission rates are as a measure of the quality of the care received in ICU. Factors external to ICU, such as surgical technique, must be considered when examining or comparing readmission rates. A patient readmitted to ICU with sepsis secondary to surgical technique does not reflect the quality of ICU care and therefore should not be included in readmission rates. Studies on ICU readmissions should focus on quality of care or patient outcomes, not disease processes. The definition of 'an ICU readmission' proposed here is therefore "a second (or subsequent) admission of a patient to ICU for a problem that is directly related to their primary admission but was potentially avoidable, or any subsequent admission of a patient to ICU which was potentially avoidable or preventable".

Implications for clinical practice and research

The findings of studies on the readmission of patients to ICU have a number of implications for clinical practice. Of greatest concern is that patients readmitted to ICU have mortality and morbidity rates up to six times higher than those not readmitted [23, 27]. Mortality rates of 26-58% in readmitted patients were reported [29, 31]. Many of these patients exhibit warning signs which staff often recognise but, despite this, patient deterioration still occurs. Resources (e.g.

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medical emergency teams, patient at risk teams, ICU liaison nurses) have been specifically implemented to assist ward staff with these types of patients. Whilst studies have examined the impact of some of these resources on ICU admission rates and patient mortality rates, the results of these studies are inconsistent [10, 41, 42].

Whilst a readmission rate of zero is desirable, it is unrealistic. However, the literature does suggest that many readmissions are preventable [17, 43]. The clinical environment clearly needs to be resourced to provide the care patients require. The direct admission of patients from ICU to general wards needs to be challenged and wards need to be staffed by skilled, knowledgeable clinicians who have the expertise to provide the care these patients require.

Many issues regarding the readmission of patients to ICU remain unexplored despite previous studies highlighting the need for further research. The opinions or experiences of the staff involved in the care of these patients have not been explored; clearly these staff are a valuable source of research data. Virtually all the studies to date have been performed by researchers who favoured a quantitative approach. One only researcher [25] has adopted a qualitative approach and this study primarily focused on the patients' experience of being readmitted.

Other areas needing to be researched include: what happens to patients after their initial discharge from ICU to a general ward; the impact of ward staffing levels and expertise on the care acutely ill patients receive; the influence of high-dependency units of ICU readmissions; the economic impact of ICU readmissions; and the development of tool to identify patients at highest risk for ICU readmission.

Conclusion

Acutely ill patients are often found on general hospital wards; some of these are patients who have just been discharged from an ICU. As general wards are not resourced to provide care for acutely ill patients, these patients are at risk of being readmitted to ICU. Whilst strategies have been designed to help provide the care these patients require, there is little agreement about the nature or cause of ICU readmissions or even what a readmission actually is.

To date, the research has primarily focused on data derived from patients' medical records, which are an unreliable source of information. Despite numerous studies being performed over the last 20 years, there is still no clear understanding or agreement about why readmissions occur. Further research needs to be done to find out more about the nature of ICU readmissions so they can be prevented or their occurrence minimised.

Acknowledgement

Chest x-ray quiz

Answer & discussion

1. No, one would not be happy with the position of the ETT as it extends a short distance into the right main bronchus. The ETT should be at least 2cms above carina.

2. The lung fields reveal a patchy infiltrate and consolidation in both lungs, most prominent in the right mid zone (circled). These appearances would be consistent with the given history of near drowning. Also, there are possibly small nodular densities in the right perihilar region (boxed) and right costocardiac angle (circled). No effusion, lobar collapse or pneumothorax evident.

There will be a follow up on this patient in the next edition.
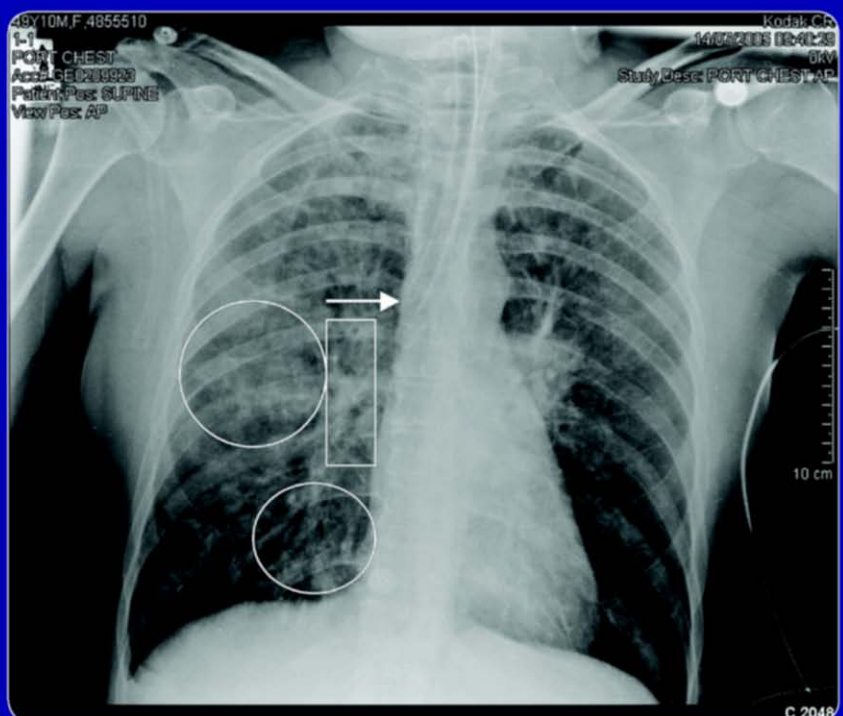
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