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Referral of patients to plastic surgeons following self-harm: Opportunities for suicide prevention☆

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Summary Self-harm is a common source of referral to plastic and hand surgery services. Appropriate management of these patients is complex and includes the need for close liaison with mental health services. Self-harm is the single biggest risk factor for completed suicide, thereby increasing the risk by a factor of 66.[1] This study aimed to analyse the clinical pathway and demographics of patients referred to plastic surgeons following self-harm.

This 6-year retrospective series included patients referred to plastic surgeons following self-harm within the Galway University Hospital group. Patients were identified through the Hospital inpatient enquiry system, cross-referenced with data from the National Suicide Research Foundation. Data collected included demographics, psychiatric history, details of self-harm injury, admission pathway and operative intervention.

Forty-nine patients were referred to plastic surgery services during the study period, accounting for 61 individual presentations. The male-to-female ratio was 26 (53%) to 23 (47%). Mean age was 40 years (range 21–95 years). Alcohol or illicit substance use was recorded in 17 of 61 (28%) presentations. Mortality from suicide occurred in 4 patients (8%). Mental health assessment was not carried out in 9 presentations (15%). Documentation of need for close or

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one-to-one observation was made in 11 cases (20%) and was not referred to in 43 cases (83%) following mental health assessment.
This study demonstrates significant diversity in the management of this vulnerable patient group and may inform development of referral pathways to improve the safety of transfer, surgical admission and discharge of patients following self-harm, in consultation with mental health services.

Introduction

Self-harm has been defined as repetitive, low-lethality actions that alter or damage the body tissue without suicidal intent.[2,3] The commonest methods of self-harm include cutting (75%), self-hitting (30%) and burning (28%).[4] More than 33 descriptors and acronyms exist for this pattern of behaviour,[2] including deliberate self-harm (DSH), self-injurious behaviour (SIB), self-mutilation, self-inflicted violence (SIV) and parasuicide. A total of 59%—72% of patients who self-harm deny having suicidal thoughts when self-harming, thus leading to the use of yet another term, non-suicidal self-injury (NISSI).[5]

Self-injury has been proposed as an action to avert suicide and relieve distress in response to psychological experiences such as tension, anger, anxiety and loss of control.[6] At the biological level, the endogenous opioid system has been implicated because of the analgesia that individuals experience during the act of self-injury along with the subsequent high many individuals experience following it.[7]

However, self-harm can be associated with suicidality, and suicidal intent can also change with time (Table 1). This has led to conflicting schools of thought whereby some researchers classify all self-harm on a continuum of suicidal behaviour.[4,8] Others believe self-harm and attempted suicide are counter-intentional and should therefore be viewed as distinct entities.[2,3] This distinction has clinical implications, as patient care by medical and mental health professionals may differ depending on how the behaviour is described (e.g. as suicidal or self-injurious).

Hospital doctors are frequently confronted with patients following self-injury from lacerations or burns and need to understand the inherent risk these patients pose for repeat self-injury and/or suicide (Table 2). Self-harm presentations are important opportunities for suicide prevention. Surgeons have the means to offer an effective intervention in the post-operative phase and before discharge in collaboration with mental health services.[13,15,16] Many issues arise when caring for these patients with regard to the safety of day case admission, transfer from referring hospitals and discharge planning. Considering the broad spectrum of self-inflicted injury referral to plastic and hand surgery services, there is a paucity of literature describing the appropriate future management of these patients' mental health.

Aim

The aim of this study was to analyse the incidence and spectrum of injuries secondary to self-harm referred to the plastic surgery service in a tertiary referral centre. We also aimed to identify ways to improve safety of referral, admission and discharge of patients following self-harm in conjunction with mental health services and to propose an intervention that aims to reduce future events.

Patients and methods

A retrospective single-centre case series was carried out of all patients presenting or referred to Galway University Hospitals (GUH) following self-harm for a 7-year period from January 2010 to December 2016. Ethical approval was obtained at the outset of this study. Hospital in-patient enquiry data were cross-referenced with data provided by the National Self-Harm Registry Ireland (NSHRI) for the study period. NSHRI is the world's first national registry of intentional self-harm presentation to hospital emergency departments, funded by the Health Service Executive's National Office for Suicide Prevention.[20] A comprehensive chart review was carried out. Data were analysed using standard statistical software package (SPSS).

Results

During the study period, 61 individual presentations of self-harm occurred in 49 patients admitted under the care of Plastic Surgery. The ratio of male to female patients was similar, with 26 male (53%) and 23 female presentations (47%). Mean age was 40 +/− 16 years with a range of 21-95 years. Concomitant alcohol or illicit substance abuse was recorded in 17 of 61 self-harm presentations (28%). Thirteen of the 49 patients (27%) had repeat presentations for self-harm during the study period.

Four of 49 patients (8%) died secondary to suicide during the study period. One patient completed suicide (self-drowning) after absconding during admission following repair of wrist lacerations. This patient left the hospital grounds during his surgical admission whilst under one-to-one supervision. He had been diagnosed with psychotic depression following psychiatric evaluation and was awaiting transfer from the plastic surgery service to the psychiatric ward under the Mental Health Act 2001. Another patient completed suicide 1 year after the repair of wrist lacerations following repeated self-harm presentations. Two patients died as a result of their self-injury (both self-immolation with > 80% TBSA), one of whom had no prior psychiatric history.

Table 1 Relationship between self-harm and suicide.

• Nearly half of the people who self-harm have reported at least one suicide attempt (Victor and Klonsky[9]).
• Self-harm can lead to suicide due to failure as a coping mechanism or by desensitising patients in crisis who may view suicide attempts as less frightening (Whitlock[10] and Stewart[11]).
• Approximately half of all people who die by suicide have previously self-harmed (Foster[12]).
• A total of 15–20% of patients in the UK who complete suicide have visited a hospital for self-harm in the year before their death (Gairin[13]).
• Between 1 in 25 and 1 in 50 patients presenting to hospital for self-harm complete suicide in the subsequent 5 years (Carroll[14] and Hawton[1]).

The mean length of stay was 2.3 days +/− 3.9 with a range of 0–26 days (Table 3). Seventeen of 61 patient admissions (28%) were followed by same-day discharge. This reflects the accepted practice of same-day discharge for patients undergoing regional anaesthesia for upper limb surgery at our institution.

The mechanism of self-injury was predominantly upper limb injury (54 presentations; 89% of total cohort of 61 self-harm presentations recorded), followed by self-immolation (3 presentations; 5%), leg laceration (3 presentations; 5%) and facial laceration (1 presentation; 2%). One patient had concomitant self-poisoning (paracetamol overdose). The breakdown of upper limb injury mechanism included laceration in 46 cases (85%), thermal or chemical burn in 6 cases (11%), biting in 1 (2%) and injection injury in 1 (2%). Upper limb injuries included skin-only injury in 20 of 54 presentations (37%), with the remaining 34 presentations (63%) involving one or more of the following: flexor tendon, extensor tendon or neurovascular (major nerve or artery) injury. Specific intra-operative findings relating to the number and type of upper limb structures injured are the focus of a further study, currently in progress, relating to the spectrum and outcomes of upper limb injury secondary to self-harm.

Self-harm referrals were received by the plastic surgery department from regional hospitals outside GUH in 34 out of 61 cases (56%) versus 27 cases (44%) presenting directly to GUH. Four patients were referred directly from off-site psychiatric units to GUH. The majority of outside referral patients were transferred by ambulance to GUH ($n = 23$, 68%), while 11 patients (32%) self-transferred to GUH. Patients referred from within GUH were transferred by ambulance in 10 cases (37%) and self-transferred in 15 cases (55%).

The time of presentation to hospital is detailed in Table 4. The majority of patients arrived outside of normal surgical working hours ($n = 34$, 56%), before 7.30 a.m. and after 5 p.m. in our institution. Seventeen cases (27%) presented during the normal working hours of the psychiatry department. The mental health history of presenting patients is summarised in Table 5. Depression was the commonest diagnosis, while alcohol or substance abuse was reported in 17 cases (28%).

Mental health risk assessment was performed and documented in 16 of the 34 presentations of self-injury referred from a regional hospital. Fifteen patients transferred to GUH for Plastic Surgery input arrived with no documentation of having had mental health assessment carried out. The remaining 3 patients did have mental health risk assessment in the referring hospital, but no documentation was provided in the medical notes transferred with the patient to GUH.

Mental health risk assessment was performed and documented in 59% (36 out of 61) of all patient presentations of self-injury to plastic surgery at GUH. In nine patient presentations (15%), mental health assessment was not performed in any hospital (neither in GUH nor in the outside referring hospital). Two of these cases were mortalities from self-immolation: one patient refused to undergo mental health assessment and the other absconded from hospital before they could be assessed. Five patients were not referred to psychiatry services for reasons which were unexplained by a detailed chart review.

Following mental health risk assessment in the hospital (52 out of 61 presentations or 85%), documentation pertaining to the need for close or one-to-one observation was made in 11 cases (20%) and was not mentioned in 43 cases (80%). This disparity in documentation existed despite comprehensive documentation of mental health assessment carried out by appropriately trained psychiatric physicians or psychiatric liaison nurse specialists. The retrospective nature of this study limits data collection to written documentation in medical notes and cannot account for verbal dissemination of such information between psychiatry and plastic surgery teams. However, written documentation of the requirement for one-to-one observation is generally required in our institution to obtain ancillary staff required to carry out this role.

A mental health follow-up plan was documented in 40 of 61 presentations (66%) on discharge of patients following self-injury. This was generally documented by the admitting plastic surgery team, after discussion with psychiatry services. Nine patients were admitted under care of psychiatry postoperatively. One patient was planned for involuntary re-admission to GUH psychiatry department before he self-discharged and completed suicide. Two patients refused admission and were not found to be detainable for treatment under the Mental Health Act 2001.

Discussion

Data from NSHRI recorded 11,485 presentations to hospital due to self-harm nationally and involved 8909 individuals or 206 per 100,000 population.[20] Two clinical programmes have been established in Ireland in 2005[21] and 2016[22] with an aim to address the care and treatment required by people who present to emergency departments following self-harm. These programmes outline several recommendations including the development of national guidelines for standardised timely assessment of needs and risk of patients who self-harm by appropriately trained mental health staff.[21,22] This study highlights on-going diversity with regard to assessment procedures and management of patients who present to hospitals after self-injury, with 15–53% of patients undergoing no mental health assessment.

Table 2 Summary of studies quantifying risk of suicide and repeat self-harm.

Author	Study type	Country of origin	Conclusion
Victor[9]	Systematic review and meta-analysis	Canada	Non-suicidal self-harm is the strongest predictor of suicide attempt after suicidal ideation.
Owens[17]	Systematic review	United Kingdom	The rate of completed suicide is 0.5%—2% in the first year after self-harm and greater than 5% 9 years after self-harm.
Carroll[14]	Systematic Review and meta-analysis	United Kingdom	The risk of suicide in the first year after self-harm is 1.6%, 3.9% after 5 years and 4.2% at 10 years. Incidence is almost doubled in males compared to that in females (2.7% vs. 1.2%). Estimated 1 year rate of non-fatal repeat self-harm was 16.3%, ranging from 13.7% using hospital admission data to 21.9% using patient-reported data.
Hawton[1]	Mortality follow-up study	United Kingdom, Scotland and Northern Ireland	Suicide risk in the first year after self-harm is 0.7% or 66 times the annual risk of suicide in the general population. The 5 year risk estimate was 1.7%, 2.4% at 10 years and 3.0% at 15 years. Males had a significantly higher risk with a hazard ratio of 2.8.
Tidemalm[18]	National cohort study	Sweden	3.0% of males and 1.4% of females died by suicide within 1 year after self-harm and 8.0% for males or 4.3% for females after 19 years. Incidence rate ratios of suicide ranged from 13.8 to 41.0 for males and from 13.2 to 45.7 for females after self-harm compared to those in population controls.
Olfson[19]	National cohort study	United States (US studies include self-harm presenting to all settings. UK, Scottish, Irish and Swedish studies included only patients treated in hospitals)	The 1-year suicide standardised mortality rate ratio was 26.7 compared with that matched with age, sex, or race and/or ethnicity in the US general population. Adolescents and young adults have a relative risk of suicide 26.7 times higher than that of the demographically matched adults after self-harm.

People who die by suicide may present to the emergency department with self-harm, often shortly before suicide (median 38 days).[13] Up to 24% of patients presenting with self-harm are discharged directly from emergency departments without undergoing a psychiatric assessment, despite their increased risk of suicide.[20,23] Diversity with regard to assessment procedures and management in hospitals, as well as feedback from families bereaved by suicide, have led to calls for the development and resourcing of an effective response for people who present to health services having engaged in self-harm.[21,22,24]

The present study recorded a high mortality rate from suicide (8%) compared with previously reported rates, which are summarised in Table 2, despite a relatively short follow-up period. This is likely related to the inclusion of self-immolation as self-harm in this study, which carries a high mortality rate as a lethal mechanism and may be better classified as suicide as opposed to self-harm. The present cohort of patients referred for plastic surgery input following self-cutting also likely had more severe or deeper structural injuries than those managed non-operatively. Depth of wound injury could reflect a greater risk for suicidal intent than those with minor repeated self-cutting or skin only wounds that may not present for medical or plastic surgery intervention and thus could not captured by this study.

In cases where mental health risk assessment was performed for patients following self-injury (47–85% of presentations) despite detailed documentation in medical notes by psychiatry services, pertinent information specifically relating to patient risk and perceived need for close observation was often absent. This information is paramount to inform admitting surgical teams how best to manage these patients in terms of the need for one-to-one observation, request for ground floor-only admission where indicated and safe transfer of patients who may be requested to travel from another facility without plastic surgery services. Requests made for

Table 3 Length of stay following admission following self-harm.

Day of discharge	Number of Presentations	Percentage of Presentations (%)
Same-day discharge	17	28
Day 1	13	21
Day 2	12	19
Day 3	11	18
Day 4	3	5
Day 5	2	3
Day 10	1	3
Day 15	1	1.5
Day 26	1	1.5
Total	61	100%
Mean	2.3 + / − 3.9 days	

Table 4 Timing of presentation to hospital following self-harm.

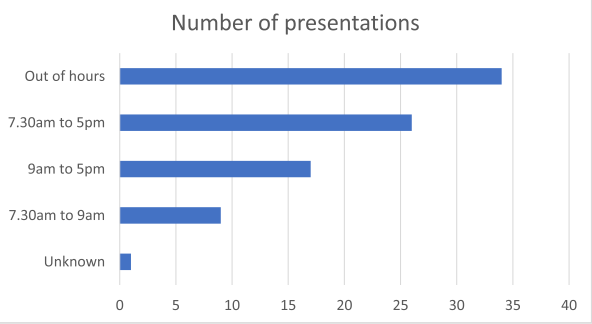
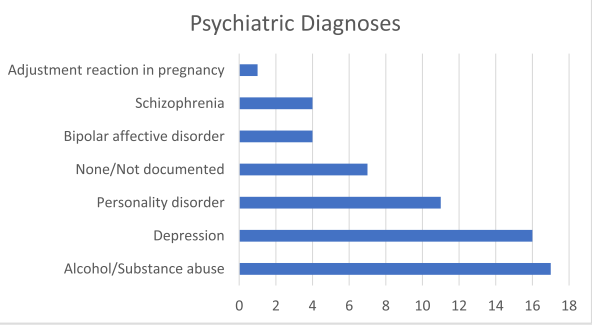


Table 5 Psychiatric diagnoses at presentation following self-harm.



one-to-one observation in our institution requires documentation of the specific need for either nursing/health care assistant or security staff observation of a patient, or both where indicated.

Given the high proportion of people who presented with minor, skin-only lacerations, many patients in this cohort were treated surgically and discharged on the same day (Table 3). Decision to discharge such a patient may be appropriate on surgical or medical grounds but may not be safe practice depending on individual psychiatric circumstances. This presents a potential risk in cases where there is lack of clear documentation regarding patient risk for a suicide and psychiatric follow-up plan. The retrospective nature of this study is a limitation that does not allow for the collection of data relating to potential verbal communication of information about patient risk between psychiatric and plastic surgery staff during each patient encounter, although this is likely to have taken place in many cases.

Repeat self-harm and suicide are key clinical outcomes in the management of patients presenting with self-harm. Repetition of self-harm was seen in 27% of our cohort during the study period and represents a significant burden on emergency services, as well as psychiatry and plastic surgery services alike. This finding is consistent with those in previous studies, with estimates ranging from 13.7% (95% CI 12.3-15.3) using hospital admission data to 21.9% (95% CI 14.3-32.2) in studies using patient-reported data.[14] This suggests a higher occult rate of self-harm, which does not result in hospital admission. The hazards of repeat self-harm are higher for those whose initial self-harm was treated in an inpatient setting (HR: 1.65, 95% CI: 1.49-1.83) compared with an emergency department (HR: 0.62, 95% CI: 0.55-0.69) or outpatient (1.00, reference) setting.[19] This most likely reflects the greater severity of injuries that require surgical intervention and associated higher degrees of violence and intent associated with these acts. Although only 28% of patients in our cohort were discharged on the same day of surgery, this would be the aim for all suitable patients with upper limb injuries in our unit, when not limited by bed shortages or emergency theatre access. Self-cutting is the method most strongly associated with a high risk of repeated self-harm.[20] This was true in our study population, with all repeat episodes consisting of self-laceration in addition to two patients who also had repeatedly inflicted burns in combination with laceration.

A large proportion of patients presented to the emergency department outside of normal working hours (73% outside of psychiatry working hours and 56% outside of plastic surgery working hours). Thus, if the injury sustained does not require a surgical admission, these patients can still be offered an effective intervention to reduce their risk of future self-harm or suicide. Only 17 cases (27%) presented during normal psychiatry department working hours (9 a.m.—5 p.m.). Outside of these hours, there is one psychiatric registrar who is on call-off site. The discrepancy in working hours between psychiatry and plastic surgery units has the potential to cause management issues and theatre delays for self-harm patients presenting to GUH for plastic surgery review between 7.30 a.m. and 9 a.m. (9 cases or 15% of our cohort) when psychiatric input may not be readily available and is reliant on the availability of the psychiatric registrar. During the course of the period studied, there were significant changes to the provision of mental health services during working hours, with the expansion of the liaison psychiatry team from one clinical nurse specialist and psychiatric registrar to the addition of a consultant in liaison psychiatry and a clinical nurse specialist in self-harm.

Effective interventions for self-harm have been well described, provided by appropriately trained healthcare providers. Cognitive behavioural-based psychotherapy

Table 6 Proforma for referral of patients to plastic surgery following self-harm.

(1) Following mental health risk assessment, is this patient suitable to self-present to plastic surgery trauma clinics the morning after self-injury?
Yes Please ask to re-attend as per Plastic Surgeon on call's instruction)
No Please discuss with Plastic Surgeon on call and arrange appropriate inter-hospital transfer as per instruction with appropriate supervision as outlined in Question 2.
Other Please specify
(2) Is there a requirement for close or one-to-one observation of this patient
Yes Please specify if nursing staff/health care assistant/security staff required
No
Other Please specify if any other observation required, e.g.: next-of-kin
(3) Document/provide full copy of relevant psychiatric assessment and treatment
Include perceived necessity for psychiatric admission, outpatient clinic, addiction services referral, psychotherapy, follow-up, need for re-referral post-operatively, etc.

Table 7 Suggestions to optimise management of patients following self-harm.

• Timely mental health assessment following presentation to assess the risk of repeat self-harm and suicide before patient discharge.
• Assessment of requirement for one-to-one observation and specification of level of observation indicated (nursing/health care assistant/security staff).
• Inter-hospital transfer should not be made until after mental health risk assessment is carried out and once an appropriate level of observation is available.
• Transfer of patient with complete copy of mental health assessment conducted in the hospital of initial presentation (time allowing) for review by referral centre, including risk assessment, treatment and local follow-up plan.

(comprising cognitive behavioural and problem-solving therapy) has been shown by a Cochrane review to reduce repeating self-harm at 6 months and at 12 months of follow-up.[25] This therapy is also associated with significant improvements in depression, hopelessness and suicidal ideation. Brief psychotherapeutic interventions delivered in emergency departments have been shown to improve outcomes in terms of treatment adherence and lower rates of subsequent self-harm-related hospitalisations and completed suicide.[24] Stand-alone interventions to mitigate suicide risk suitable for emergency department settings known as Safety Planning Interventions (SPI) have been found to improve outcomes in this group of patients.[16] The basic components of SPI include recognising warning signs of an impending suicidal crisis, employing internal coping strategies, utilising social contacts and social settings as a means of distraction from suicidal thoughts, utilising family members or friends to help resolve the crisis, contacting mental health professionals or agencies and restricting access to lethal means.

Alcohol and substance misuse were associated with presentations of self-harm in 28% of our cohort. This finding is in line with that reported in the literature, which reports alcohol consumption is implicated in more than 37% of cases of self-harm in Ireland.[17] Half of the patients who die by suicide have had a history of alcohol abuse in the final year of their lives.[26] Alcohol and drug misuse further complicated the management of patients following self-harm in terms of patient co-operation and may cause delays in both surgical and psychiatric intervention in this population. Comorbidity of mental health illness and substance misuse is well known to increase the risk factors for self-harm and suicide.[27] Provision of alcohol and drug counselling in the acute hospital setting has been associated with improved outcomes as do brief interventions such as motivational interviewing.[28]

In consultation with psychiatry and emergency departments, a standardised referral pro forma (Table 6) has been drafted by the authors to optimise referral of patients to plastic surgery and other surgery specialties following self-injury. This simple pro forma proposes three minimum datasets to guide safer admission pathways for patients after self-injury and to improve documentation of the following parameters:

(1) Patient suitability to self-present to plastic surgery trauma clinic.
(2) Requirement for close or one-to-one observation.
(3) Documentation of a thorough psychiatric assessment and treatment plan.

The results of the present study show diversity in the assessment and management of patients following self-harm that could impact patient safety. Elements of patient management unique to this high-risk patient cohort are summarised in Table 7.

Conclusion

This study demonstrates considerable variation in referral and care pathways of self-harm patients across a hospital group, as well as the role of plastic surgeons in treating a wide spectrum of injury mechanisms. Guidelines for the assessment and management of patients presenting with self-harm and suicidal behaviours to hospital should be developed and implemented as a matter of urgency. Plastic surgeons, in consultation with emergency and psychiatry services, have a unique opportunity to help standardise and improve the management of patients referred following self-harm.

Conflict of interest

The authors have no conflicts of interest to disclose, and no funding was obtained to carry out any aspect of this study.

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