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Original Research

When things go wrong: A surgeon's guide to iatrogenic injury (Perspective)

Nick Simson[a,*], Thomas Stonier[b], Ben Challacombe[a], Sarah Wheatstone[a]

[a] Guy's and St Thomas' Hospital, Great Maze Pond, London, United Kingdom
[b] King's College Hospital, Denmark Hill, London, United Kingdom

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1. Introduction

Iatrogenic injury is a rare, but serious complication that can occur in every surgical specialty. With increasingly aggressive surgical approaches to advanced cancers and complex pathologies, iatrogenic complications, including bowel, vascular and ureteric injuries, have become relatively common (see Table 1) [1–3]).

Occasionally, these injuries may occur to structures or organs with which the primary surgeon has limited experience. This subsequently necessitates an urgent referral to another specialist surgeon, in order for them to attend theatre and advise, assist or intervene.

Whilst the rates of such serious complications are well documented, and discussed with patients routinely during the consent process, they can nonetheless cause considerable anxiety when they occur [4]. A well-trained, competent specialist surgeon should have the technical skills to resolve the problem on arrival. However they are often faced with a number of challenges: the referrals can often occur out of hours; in an unfamiliar theatre or even hospital site; with limited familiar equipment; staff inexperienced in the salvage/reparative procedures, and in a tense, stressful environment.

Although much is published with regards to the reconstructive techniques of dealing with iatrogenic injuries, there is very little guidance on the surgeon's non-technical skills. The mind-set, planning, and behaviour when approaching these unfamiliar situations are vitally important. Given the often emotionally charged nature of an operating room in which an iatrogenic injury has occurred, a calm, professional and reassuring demeanour may be equally as valuable as technical ability.

We aim to give some structured guidance to navigate the particular challenges of this difficult situation, as it is currently lacking in the literature.

2. Before arrival in theatre

As multi-site working and non-resident on calls become increasingly common, the attending surgeon may have to travel some distance before arriving in theatre. It is important that this time is not wasted, and effective preparation and planning occurs during the travelling time.

When receiving the referral, the surgeon must gather as much information as possible regarding the patient and the operation, in order to predict the different challenges they may face, and prepare for all eventualities. This will include the medical history of the patient, any pre-operative investigations and imaging, the operative findings thus far, as well as the equipment available in theatre, and the facilities available in hospital.

The specialty surgeon may use this phone call as an opportunity to give some advice to the primary surgeon whilst they make their way to theatre. This can include methods of stabilising the patient, and basic techniques to improve the situation or exposure to help the arriving colleague.

One of the biggest challenges to overcome is a potential lack of equipment available in an unfamiliar theatre. The incoming surgeon should use the time before arriving in theatre to communicate what equipment may be necessary and request it be obtained. This may range from specific sutures, bowel staplers, and stents to endoscopic stack systems, x-ray compatible operating tables and gowns, and may even require involving other members of staff such as radiographers or interventional radiologists (see Table 2).

* Corresponding author. 36C Fortune Green Road, London, NW6 1UJ, United Kingdom.
E-mail address: njsimson@gmail.com (N. Simson).

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Table 1
Common referrals by specialty.

Specialty	Common Referrals
Vascular	Significant haemorrhage Major vessel ligation
Urology	Bladder/Ureteric Injury
Plastics	Unexpectedly large defect needing closure
General Surgery	Bowel injury Splenic injury
Hepatobiliary	Bile duct injury Liver injury
Gynaecology	Unexpected ovarian/endometrial pathology identified

Table 2
Additional equipment that may be required.

Additional equipment that may be necessary
Instruments
Sutures, guidewires, stents, staplers
Camera/Stack System
X-ray compatible table
Loupes, Headlights
Tourniquets
Radiographer
Another member of specialty team (registrar, scrub nurse, consultant colleague)

Occasionally specific equipment will be unavailable at the hospital, and it is sensible for the surgeon to have access to such kit in case it is required to be brought with them.

It is often a good idea to bring another member of the specialty team, such as a registrar or experienced scrub nurse, who is familiar with the equipment and the techniques and can assist effectively.

In particularly rare, or complex situations, it may be necessary to consult other experienced colleagues whilst en route to the operating room. Have they had previous experience with cases like this? What did they do, and what would they advise?

It is thus important that the time between referral and arrival is used effectively and efficiently to minimise any delays upon arrival (see Table 3). A registrar may arrive before their consultant and not feel experienced enough or comfortable to deal with the particular situation. However, they must be able to organise the logistical preparation as above in order to make the process as smooth as possible.

3. On arrival in theatre

At all times, the patient remains the absolute priority, and as such it is imperative to make sure that they are stable on arrival to theatre. Once this is the case, it is the role of the arriving surgeon to set the tone for the next steps of the procedure.

Emergency operations and those with additional teams involved have a high chance of a Never Event occurring [5]. Therefore an intra-operative pause/time-out should occur to accommodate the new members safely. The surgeon should introduce themself with their name, specialty and grade. They should establish the roles of the theatre personnel, and particularly their experience in dealing with specific equipment and this type of situation.

It is not uncommon for patients to be under spinal or regional anaesthetic, and if this is the case, the surgeon should promptly introduce themself, and explain what is happening. Liaison with the anaesthetist to consider conversion to a general anaesthetic is sensible as the operation is likely to be much more prolonged than anticipated. Antibiotics may be required.

The environment in the operating room can be fraught, and it is not uncommon for the primary surgical team to display signs of anxiety about the situation. It is important to have situation awareness and act in a calm, professional and reassuring manner throughout, whilst remaining non-judgemental and not assigning individual blame.

It is sensible for the initial surgeon to describe the situation, what preceded it, and to give a “tour” of the operative findings so far. Although this is invaluable in explaining the events that have taken place, it is also good practice to perform an independent review of the patient's anatomy oneself. Whilst the incoming surgeon takes stock of the situation, it is a good opportunity to suggest that the primary team stand down for a few minutes to take a break and compose themselves after what may have been a long period since the procedure began. This also relieves the specialty surgeon of a large audience as they familiarise themself with the operative field [6].

The incoming surgeon must then decide whether to directly repair any injury during this procedure (e.g. primary bowel or ureteric anastomosis), or stabilise the patient and ensure they progress safely until delayed intervention (e.g. stoma formation, damage control surgery, packing to control haemorrhage etc). In cases of minimally invasive surgery it may be more straightforward to convert to an open approach to ensure a sub-optimal repair does not compound the original iatrogenic injury. There can be reluctance to open the patient from the initial team who see it as a failure in itself but it is usually far more likely that a good outcome will result with maximum exposure and negotiation may be required.

4. After the operation

After a careful swab and instrument count, including all extra items, it is important to complete the WHO ‘sign-out’. Ensure all the procedures are coded accurately in the theatre log, and histopathology or microbiology specimens correctly labelled. Consider if the initial post-

Table 3
Pre-operative, intraoperative and post-operative suggestions.

Before arriving in theatre	On arrival in theatre	After leaving theatre
Gather as much information as possible	Ensure the patient is stable	WHO sign out ensuring extra equipment accounted for
Anticipate potential obstacles/difficulties	Introduce yourself to theatre team. Intra-operative Time-Out	Document clearly and accurately
Give advice to primary surgeon to stabilise the patient/prepare for your arrival	Assess experience of assistants, scrub nurse	Document the facts from when you arrived, do not speculate on prior events
Request necessary equipment	Calm, professional, reassuring behaviour	Introduce yourself to the patient/family Explain events and the recovery plan
Bring equipment unavailable on-site	Assign no blame	Follow-up, ensure post-operative instructions followed
Organise other specialties (radiographer, interventional radiologist)	Allow the surgeon to explain the situation, operative findings etc	Answer patients' questions
Bring a member of your team	Allow the operating team to step away from the case	May need to be involved in Duty of Candour disclosure.
Consult experienced colleagues if particularly rare/complex case	Perform an independent review of the situation yourself Respect the role of the primary surgeon	Offer a debrief. If appropriate, teach to avoid future problems

operative ward location remains appropriate or if critical care or specialist unit is required. Thank the staff members for dealing with an unfamiliar emergency procedure.

Cases of iatrogenic injury are not uncommonly associated with medico-legal proceedings [7]. It is therefore extremely important to document clearly and accurately the events that took place from when the referral was received. The specialty surgeon should write a separate entry to the operation note pertaining to the parts of the procedure they were involved in and diagrams may be beneficial. . Post-operatively the patient may be cared for by teams unfamiliar with the visiting speciality, the complexities of the repair/salvage surgery and the expected recovery, so a detailed plan is required. Drains and catheters should be clearly labelled and their management explained. Easy methods of re-contact including emails and mobile phone numbers should be exchanged.

It is important for the surgeon to note that they were not present at the time of the injury, just during the aftermath. It is therefore imperative to document the facts as far as they know them, and not presume the events that took place before they arrived.

The role of the attending surgeon is not over at the end of the operation. It is their duty to introduce themselves to the patient and family, explain the parts of the procedure they were present for, and answer any questions in relation to the relevant part of the operation and the recovery. The surgeon should not assume that the primary team is experienced in the post-operative care of these patients and therefore make sure that the post-operative instructions are followed. A specific outpatient appointment with the emergency surgeon may be useful to explain what has happened in a calm environment when the patient has been discharged.

If asked about the nature of an iatrogenic injury, the surgeon has an ethical and legal duty of candour to disclose that an adverse effect has occurred, and must not cover up for a colleague [8,9]. Equally, it is important to refrain from attributing fault to individuals when not present.

A debrief with the initial team should be offered which can be deferred if more appropriate. If the surgeon perceives the injury to have been avoidable, and feels that their relationship with the primary surgeon is suitable, it may be appropriate to give some guidance in order to avoid future problems. However an appreciation that we are all fallible, and that errors are easier to spot in hindsight is recommended.

5. Conclusion

Being called to an unfamiliar environment to assess and repair iatrogenic surgical injuries can be a particularly stressful situation with many non-technical challenges aside from the complexity of the surgery.

A well-planned, structured and professional approach can alleviate tension within the operating room, optimise team performance, and ultimately achieve the desired best outcome for the patient.

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None.

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