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Commentary

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The surgical management of abdominal wall complications in renal transplant recipients, current knowns and unknowns

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Abstract

There are a range of complications that may supervene in the surgical site of the abdominal wall of adult renal transplant recipients in up to 19% of cases. Impaired wound healing related to underlying medical factors, the requirement for immunosuppression along with surgical factors all plays a part. However as yet the precise contribution of each factor remains unknown. Surgical management needs to be tailored according to the type of complication as well as the context, with complete abdominal wall healing being the goal. There is the small but significant risk of additional complications ensuing including during the deployment of Negative Pressure Wound Therapy or following surgical repair of the deep fascia, but the true incidence of these particular complications remains unknown at this point in time. In particular either further or ongoing infection in the abdominal wall may occur, which then requires even more aggressive management, including reoperative surgical procedures. There remains limited published data on how best to manage the more complex end of the spectrum of these abdominal wall complications. Thisincludes where there is significant tissue loss or when contaminated and or infected prosthetic mesh is an issue, which has implications for current clinical practice.

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Body

Abdominal wall complications occur in 3 – 18.6% ofadult renal transplant recipientspost operatively [1-5], with the range of such complications including Surgical Site Infections (SSI), acute superficial or deep fascial wound dehiscence, and slow wound healing andincisional hernia formation. The known risk factors for abdominal wall complications in renal transplant recipients include the use of immunosuppression combined with underlying medical comorbidities, such as diabetes, obesity and a history of smoking [1,6]. Surgical factors including the requirement for urgent reoperative surgery, along with the development of either hematomas or lymphocytes can also at times contribute to subsequent abdominal wall complications [7]. The presence of Infection is known to impair wound healing, withthe susceptibility of transplant recipients to infection being influenced by the intensity of theirexposure to pathogens as well as their net state of immunosuppressant [8]. This can also lead to the development of difficult to manage opportunistic infection in either the abdominal wall or around the renal allograft [9]. It is also possible that a genetic predisposition to surgical site infection [10], can be further unmasked in transplant recipients.

The process of wound healing involves the well described stages of hemostasis, inflammation, proliferation and remodeling which requires that a complex interplay between cytokines, growth factors and proteases all occur [11]. However, the precise nature of the perturbed alterations in these molecular and cellularpathways in immunosuppressed transplant recipients remains unclear at this point in time.

It is now understood clinically that there is a spectrum of wound healingpatterns that occurs in renal transplant recipients in clinical practice.Some recipients with risk factors for impaired healingexhibitnormal patterns of wound healingwhilst other recipients with similar risk factors exhibit significantly delayed healing of the abdominal wall [9], and/or loss of abdominal wall integrity, leading to either dehiscence or hernia formation. The precise interplay between all of the known clinical risk factors for the development of wound complicationscurrently remains unclear. A greater understanding of these factors will become essential in both the optimization of patientsprior to surgery, along with tailoring the management of abdominal wall complications post transplantation.

Currently there are a range of management options available for abdominal wall complicationsin renal transplant recipients depending on the type of complication which is sustained.These include operative, non-operative and selected interventional radiological procedures in conjunction with simple or more sophisticated wound dressings. However management of these complications is not only an additional burden for eachindividual recipient, but also increases the costs of managing a transplant recipient from both a healthcare and a societal perspective [12,13].

With surgical site infection ranging from superficial wound infection through to deep, allograft associated infection [14], surgical wash out and debridement along with targeted antimicrobial therapyform the basis of management, withsubsequent wound closure achieved by

primary or secondary intention. At times despite aggressive surgical management, ongoing deep tissue space infection can be a factor in loss of the renal allograft (9). A range of wound dressings including negative pressure wound therapy (NPWT), otherwise known as the VAC dressing continue to beused , including in our own experience [15,16]. The deployment of NPWT can be required for significantperiods of time varying fromweeks to months [9]. Howeverthere have been reports of adverse outcomes associated with the use of NPWT in non-immunosuppressed patients including wound infection or severe systemic sepsis [17]. Recurrent abdominal wall infection in the presence of NPWT leading to delayed healing of the abdominal wall hasnow also was recently described in 3 renal transplant recipients for the first time [18]. Henceit seems that extra vigilance is required with the use of NPWTinsuch cases.

The management of deep fascial dehiscencein renal transplant recipients includes primary closure of the abdominal fascia and in some cases the use of prosthetic mesh where fascial closure is not possible [19]. At times NPWT may be deployed until abdominal wall healing is achieved [16]. In extreme cases with significant loss of tissue from the abdominal wall wound management can be more difficult and may involve multistage surgical repair with debridement, wound packing and in some cases, delayed definitive repair [19]. If a prolonged period of management with wound dressings including NPWT has been required in the setting of an open abdominal wall, consideration needs to be given to other definitive abdominal wall repair options including the use split skin grafts or even on occasion, component separation or Tensor Fascia Lata (TFL) grafts [20]. Rarely the placement of prosthetic mesh in the abdominal wall combined with NPWT (the mesh traction technique) may be required [18]. However, there is no data published on this approach for an open abdominal wall following deep fascial dehiscence in renal transplant recipients.

Incisional hernia development affects between1.1-18% [20,21] of recipients and may occur months to years following renal transplantation [7]. Standard methods of operative repair are employed with prosthetic mesh being required in 60-92% of cases [22-24].The most common complications following incisional hernia repair are hernia recurrenceandinfection requiring removal of the prosthetic mesh. It is not known as yet, as to whether it is possible to salvage infected meshby undertaking secondary surgical procedures combined with NPWT in immunosuppressed transplant recipients. However, this approach is now described in non- immunosuppressed individuals following incisional hernia repair of the abdominal wall [25].

In conclusionmanagement of the spectrum of abdominal wall complications in renal transplant recipients remains an ongoing challenge in transplant units.This requires that particular attention be paid to wound care, along with the early recognition of wound complications and the medical optimization of recipients.In addition the deployment of a range of tailored surgical interventions depending on the context are also required. However there remain unanswered questions, partly due to the limited amount of data published to date on these patients [26]. This applies particularly tothoserecipients who sustain the more severe types of abdominal wall complications, includingin particular tissue loss, who then require prolonged management. Consideration needs to be given to how best to facilitate this type of data now being reported via collaborative research endeavors. Future research is also required into gaining a greaterunderstanding of the factors that are associated with poor wound healing including the interplay between the immunosuppression and the impact on the local wound environment. In particular the effect of wound management techniques inaltering the inflammatory response, including the cellular proliferation and remodeling pathways,which will then facilitate a more tailored, targeted approach towardsthe management of these complex patients.

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