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S. E. Podpryatov, S. S. Podpriiatov, V. P. Korchak, I. O. Bielousov, I. V. Satsiuk
Kyiv municipal hospital № 1
Kyiv, Ukraine

С. Є. Подпрятов, С. С. Подпрятов, В. П. Корчак, І. О. Білоусов, І. В. Сатсюк
Київська міська лікарня № 1
Київ, Україна

HEALING PROBLEMS WITH «LITTLE» WOUND. SURGERY STRATEGY

Проблеми зацiплення з «малою» раною. Хірургічна стратегія

Abstract

Purpose of the study. *An analysis of own experience in treating wounds which were found to need special treatment or ended in failure.*

Methods. *Results of treatment of 221 patients were analysed. Criteria of inclusion were wound/necrosis/blow size not more than 5 cm in greatest measurement at arrival. The force of blow was not greater than the body weight. Of patients 149 have diabetes mellitus, on anticoagulant therapy were 53.*

All patients have been operated on, onetime 132, twice 53, three times 28, four times or more 8.

Results. *Complicated healing was caused by prolongation of inflammation in 47 cases, spreading of necrosis in 35, arising of compartment syndrome 7.*

The most important reasons of complications were 1) edema of patient's limb, difficulties in; 2) acceptance of limbs compartment syndrome both of microbial and coagulopathy origin; 3) differentiation between routine and Clostridia genesis of inflammation, 4) estimating rightful duration of drainage staying and antibacterial therapy in compromised patient.

Conclusion. *In cases of specific infection, coagulopathy, limb edema of different etiology and, in diabetic patients, renal insufficiency, low c-peptide level, and insulin resistance each of this obstacles lead to special complications, if neglected may result in limb amputation and, be even life threatening. Each of it need a peculiar treatment. Knowing of this specifics gives to surgeon some particular tool in treatment.*

Keywords: *wound, complicated healing, surgery.*

Резюме

Мета. *Аналіз власного досвіду лікування ран, які потребували спеціального лікування або лікування яких виявилось неефективним.*

Методи. *Лікували 221 пацієнта. Критеріями включення були рана/некроз/синець не більше 5 см в діаметрі в найбільшому вимірюванні при появі, сила удару не більша за масу тіла. Цукровий діабет був у 149 пацієнтів, антикоагулянтну терапію отримували 53.*

Всі пацієнти оперовані, один раз 132, двічі 53, тричі 28, чотири рази або більше 8.

Результати. *Ускладнення загоєння було зумовлене продовженням запалення в 47 спостереженнях, поширенням некрозу в 35, виникненням компартмент-синдрому в 7.*

Найважливішими причинами ускладнень були 1) набряк кінцівки у пацієнта, труднощі в; 2) встановленні компартмент-синдрому як мікробної, так і коагулопатичної етіології; 3) диференціації між запаленням звичайної та клостридіальної етіології; 4) встановленні правильної тривалості дренування та проведення антибактеріальної терапії у пацієнтів з обтяженим станом.

Висновок. *В разі особливої інфекції, коагулопатії, набряку кінцівки різної етіології, та, у хворих на цукровий діабет, ниркової недостатності, низького рівню с-пептиду, інсулінорезистентності кожна з причин може викликати особливі ускладнення, які, будучи не враховані, можуть привести до втрати кінцівки і, навіть, життя. Кожна причина потребує особливого лікування. Знання вказаних особливостей дає хірургу визначені можливості для лікування.*

Ключові слова: *рана, ускладнене загоєння, хірургія.*

BACKGROUND

Wounds remains the medical question one of the most frequently occurred. Due to ability of human organism to heal many injuries that are not life or disable threatening are going underestimated by patient and by doctor as well.

But such behavior is not always end in good. This may be connected to special microbial contamination, complicated health of patient and some other factors. Environmental, age-related and habitually caused influences and long-going or even life-long treatment applied to some people resulted in continent changes in microbiological surrounding, human tissues and whole organism reactivity which, in turn, cause new course of healing with it new manifestation which need to be addressed.

PURPOSE OF THE STUDY

An analysis of own experience in treating wounds which were estimated as not large and threatening at the appearance with peculiar attention to those that later on were found to need special treatment or ended in failure.

Material and methods. Results of treatment of 221 patients with wound or local necrosis or bruise from January 2005 till October 2020 were analysed. Criteria of inclusion were wound/ necrosis/blow size not more than 5 cm in greatest measurement at arrival. In the case of blow the force was not greater than the body weight. There were 84 women and 89 men aged from 37 to 92, mean 68,6. interquartile range 14,0 years. Of them 149 have diabetes mellitus, 5 of type 1, 124 of type 2. On insulin treatment were 84 patients, peroral pills receives 58, diabetes mellitus was first diagnosed in 7. On anticoagulant therapy for cardiac problems were 53 patients.

All patients have been operated on, onetime 132, twice 53, three times 28, four times or more 8. Of patients 7 were followed up to 3 months, 5 up to 6 months, 15 up to 12 months, 26 from 2 to 13 years.

RESULTS

To every patient wound surgical debridement was performed and appropriate drug treatment applied at the time of arrival. Uncomplicated healing was achieved in 132 (76,3%) cases. Complications were caused by the prolongation of inflammation in 47 cases, spreading of necrosis in 35, arising of compartment syndrome in 7.

It became impossible to stop inflammation, started from the little wound or necrosis, in all 8 patients with edema caused by cardiac, kidney failure or lymphostasis. Moreover, in such a situation even limb amputation undertaken as the last resort attempt was unsuccessful in healing wound at cutting margin and do not prevail patient's death.

In 82 diabetic patient without general edema repeated surgeries was successful in the meaning of saving live at the rate of 97,6%, but high amputation was performed in 14,6% of them. Stroke had happened during the wound healing in 5 of them and myocardial infarction in 2.

Limb compartment syndrome treatment was successful in life saving in 3 patients, in limb saving in 2.

DISCUSSION

The majority of wounds at the moment of their appearance or visualization perceived by patient as "little". This may be referred to not large wound size, and to minor pain sensing, and to patient unwilling to make a visit to doctor. Hence it resulted in self-approach treatment.

Vast majority of such wounds heal without complications, so public acceptance of such behavior is favorable.

Therein lies the background of delate surgical aid only when unsuccessful treatment became evident often with threatening signs.

While the importance of timely and adequate surgical and antibacterial therapy is already generally acknowledged, the first choice is often problematic.

Reasons for this conditioned by possibility of early recognizing the causative bacterial agent which is not everywhere accessible and doctor's knowledge. The last is especially important and variable.

Thus it is for specialists to present general practitioners with the important reasons and signs of probable difficulties and complications.

Our experience shows off 1) undervaluation the importance of preemptive getting edema out of patient limb to reach the beginning of wound clearance and regeneration, difficulties in; 2) acceptance of limbs compartment syndrome both of microbial and coagulopathy origin, 3) differentiation between routine and Clostridia genesis of inflammation; 4) estimating rightful duration of drainage staying and antibacterial therapy in compromised patient.

It should be of practical value to figure out most important and useful tools in surmounting pointed problems.

Just using of limb compressing with the tight fit to the third class of compression in repeating manner over every two hours had to lead to complete disappearance of edema of inflammation origin in all our cases. Combined with appropriate antibacterial therapy and, in founding pus, with surgical drainage, it caused cutting short active phase of inflammation and turn it into regenerative process during 24–36 hours.

At the same time, impossibility to get edema out within time stated, especially accompanied by

acute pain, was the sign of deep undrained abscess or decompensated cardiac congestion which need special treatment and, as a rule, cause changing of treatment tactic.

Without tissue compressing edema dissolving take 3–4 days with more than equal prolonging of treatment duration.

We observe two kinds of limb compartment syndrome of bacterial origin. One was caused by vastly spread suppuration which involve more than a leg but with Cocci, and Proteus, and Klebsiella as causative microorganisms as well. For the reason of dramatic delay of treatment for 4–6 day patients were hospitalized at the stage when limb amputation was the only possible way of treatment which resulted in recovery.

The other one was inflammation caused by Clostridia. Main manifestations of such process were patient complaints on intensive pain and visual growing of edema within 6–12 hour. Correct apprehension of the situation followed by urgent vast opening of the muscular compartments in conjunction with clindamycin using in high dose make it possible to save limb and life. Critical point for in-time diagnosis were appearance of paresthesia and muscular stiffness with high levels of creatinine and transaminases. In delaying treatment for 24 hour or more lethal outcome was inevitable despite any treatment used.

Particular kind of limb compartment has coagulopathy in basement. Accident struck in time of anticoagulant treatment was followed by slow swelling of hematoma which in 3–4 days eventually resulted in compartment syndrome. Indications to surgical treatment was the same as abovementioned. Some complicity of situation was the necessity for immediate surgical opening of compartment at the time of anticoagulant activity of long-lasting medication. That imply substantial hemorrhage liable to blood transfusion. But all of that was reasonable in the view of saved limb.

Though prolonged and often complicated healing in diabetic patient is not surprising our investigation throw fresh light on its background. Current status of healing knowledge and metabolic contribution to it elucidates new details in possible ways of treatment.

We have singled out three metabolically induced reasons for delayed wound healing in diabetic patients.

They are renal insufficiency, low c-peptide level, and insulin resistance.

At the first glance high levels of creatinine blood urea from patient with diabetic foot doesn't routinely evidence renal insufficiency for it may resulted from extensive suppurative inflammation. But if high levels of those metabolites remains after successful surgical purse and antibacterial treatment the renal insufficiency should be considered.

In this situation wound healing in our patients was achieved only if prolonged antibiotic therapy had been given. Antibiotic had been chosen according to bacterial susceptibility and given continuously without interruption up to the time of wound filling with granulations. It takes from 24 to 45 days. Situation described takes patience both from surgeon and patient as no signs of healing are visible during first 12–14 days of treatment. Only absence of active inflammation and propagation of tissue destruction with some, but not significant, improvement of cytological picture could keep in them faith in success.

Low c-peptide level is a serious obstacle in the way of healing. It determines regeneration within narrow frame by lack of energy and building material. Though real reason of low c-peptide level in certain patient is poorly understood advanced medicine proposes some drug with the useful effect. Such are GLP-I agonists and DPP blockers. If patient is not on a such treatment it should be considered and tried.

At the first glance insulin resistance create the same hurdle to healing as low c-peptide do. Despite of it high level insulin is not available to tissues. But the difference between those two conditions is that by means of metabolic surgery insulin resistance could be successfully eliminated in short term. Out experience of treating those condition in 6 cases lead to insulin resistance disappearing within 2 weeks after surgery in all of them.

CONCLUSION

Difficulties in "little" wound healing emerge in cases of specific infection, coagulopathy, limb edema of different etiology and some metabolic changes caused by diabetic mellitus, i.e. renal insufficiency, low c-peptide level, and insulin resistance.

Each of this obstacles lead to special complications, if neglected may result in limb amputation and, be even life threatening. Each of them need a peculiar treatment. Knowing of this specifics gives to surgeon some particular tool in treatment.

Conflict of interest. Authors proclaim no conflict of interest.

Statement of informed consent. All patients signed an informed consensus for surgery.

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