

GROIN HERNIA SURGERY IN NORTHERN GHANA – HUMANITARIAN MISSION OF POLISH SURGEONS IN TAMALE

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Availability of surgical care in Africa is severely limited. This is due to the lack of surgeons and a small number of public hospitals. Only 25 out of 100,000 patients with inguinal hernia undergo a surgical treatment. As many as 65% of inguinal hernia repairs are performed urgently because of incarceration. Among patients with incarceration who do not reach the hospital there is recorded as many as 87 deaths per 100 cases. In order to improve the availability of treatment of inguinal hernia in Africa, humanitarian medical missions involving surgeons from Europe are organized. During regular visits to selected centers in Africa, they also carry out intensified treatment of patients and training of the local staff.

The aim of the study was to present the experience of Polish surgeons from the humanitarian medical mission in Tamale in northern Ghana undertaken in fall of 2014.

Material and methods. Surgical repair was performed in 87 patients (74 men – 85% and 13 women – 15%) between the ages of 26 to 70 years (mean 52.8 years; SD 10.3), who underwent a total of 98 inguinal hernia repairs under local anesthesia.

Results. Lichtenstein procedure was performed in 93 and Desarda technique in 5 patients. Patients reported the long-term presence of hernia symptoms – from one to 7 years (mean 3.4 years, SD 1.4). In most patients, hernia occurred more than 3 years earlier (61 patients; 70%). There were no intra-operative complications. All patients were discharged the next day after surgery. There was one wound infection in postoperative period which required mesh explantation.

Conclusions. Inguinal hernia commonly found in Ghana is a major issue for the inefficient health care system. Humanitarian medical missions can help to improve the treatment results, as long as they are carried out periodically and allow for training of local personnel. Scarce equipment of medical facilities in Ghana is not a significant difficulty in performing the Lichtenstein repair under the local anesthesia.

Key words: inguinal hernia, Africa, Ghana, humanitarian mission, surgery

Availability of surgical care in Africa is considerably limited. It results, among others, from insufficient staff resources, small number of public hospitals, which are located in considerable distance from each other and from limited possibilities to transport patients quickly and efficiently (1, 2, 3). Consequently, results of patients treatment considerably differ from the European and American realities. It is reflected in the data presenting results of treatment of inguinal hernia in Africa (4). A small number of planned operations leads to the fact that in some centres as

many as 65% of inguinal hernia surgical repairs are performed in emergency mode due to incarceration (5). For comparison, in Europe and the USA, incarcerations constitute only 1-3% of all hernia operations. In the majority of cases, surgical repairs of incarcerated hernias in Africa are performed too late, usually after 72 hours since the time of incarceration. It leads to increased number of necessary section resections of intestines – 24%. In these cases, the postoperative mortality reaches 6%. At the same time, as many as 87 deaths per 100 cases are recorded among patients with

incarceration who do not reach the hospital (6, 7).

Taking into account the fact that inguinal hernia occurs in adults in Africa approximately ten times more often, it leads to a situation when big neglected scrotal hernias are observed (8). They impair everyday life, limiting the capability to perform physical work by – the most often – the only breadwinner in the family who suffers from such pathology. Shortages in financing the medical care system in Africa lead to the fact that only 25 patients with inguinal hernia are operated per each 100,000 inhabitants. At the same time, the incidence amounts to 60-175/100,000. Thus, there is a deep deficit in the treatment options for this disease. However, in the majority of cases, tension operations are still performed, since the costs of modern synthetic meshes and a lack of distribution networks for these articles limit the chances to perform the western ‘golden standard’, i.e. tension-free operations.

In order to improve the availability of treating inguinal hernias in Africa and reduce the number of deaths possible to be avoided following proper treatment, humanitarian medical missions are organised. Surgeons are employed for these, mainly from Europe, who – making use of their experience – take part in cyclical projects, during which patients in selected centres in Africa are intensely treated. At the same time, local staff is trained (6, 7). Doctors from Poland also participated in many missions that took place in the last 10 years.

The aim of this paper was to present the way of inguinal hernia treatment during the humanitarian medical mission conducted by Polish doctors in autumn 2014 in Tamale in the north part of Ghana.

MATERIAL AND METHODS

A humanitarian medical mission was conducted between 18 September and 5 October 2014. The aim of the mission was to perform a series of inguinal hernia surgical repairs. Three surgeons from Poland took part in the project. The operations were performed in Shekhinah Clinic in Tamale in the north part of Ghana – the third biggest city, with 600,000 inhabitants. Currently, it is the city with the highest population growth rate in Africa. At the same time, there is only one public hospi-

tal in Tamale, which also provides teaching activity. Shekhinah Center was established with the support of the World Health Organization and is managed for almost 20 years by a local doctor – Dr David Abdulai. Services rendered in the Centre are completely free of charge and intended for local inhabitants, including – first of all – the poorest ones. For surgeons’ disposal there was a makeshift operating theatre with only basic equipment (couches, operation lamps, tables for tools). The fact that there was no device to perform even the most basic electrocoagulation resulted in the situation, in which no techniques for thermal closure of vessels were applied. Housing conditions made it possible to perform two operations by two teams at the same time in one room. Additional two persons from local staff took part in operations, having first completed a basic training involving operating nursing. These persons usually take part in inguinal hernia operations performed with the use of traditional tension methods in the Centre. All medical materials necessary to perform the operation (gowns, surgical drapes, disinfectants, tools, dressing materials, surgical threads, synthetic meshes etc.) were collected by the doctors in Poland and transported to the site. Medical clothes and tool sterilization procedure was conducted with the use of steam sterilizers, provided by the Centre.

Inguinal hernias were diagnosed by the trained local staff, on the basis of physical examination and interview. All adult patients who reported to the Centre with diagnosed inguinal hernias were classified to operations and deadlines for these operations were fixed. In total, during 9 operating days, 106 surgical procedures were performed in 95 patients, including 98 operations of inguinal hernia. Two operating techniques were applied – the Lichtenstein’s and Desarda methods. The Lichtenstein operations were performed as the first choice method, according to generally accepted protocol, with the use of a polypropylene mesh (Premilene, B.Braun). In case involving doubts as to whether there were conditions supporting mesh ingrowth (incomplete hemostasis, doubtful asepsis etc.) or if no such materials were available on the operating day, a Desarda method was applied, with the use of a bilaterally pedicled strap of external oblique muscle aponeurosis in order to strengthen the posterior wall of an inguinal canal. Intracutaneous

absorbable sutures were used in case of all patients to close their skin in order to eliminate the need of next patients' reporting for a follow-up visit in order to have the stitches removed. Patients reported for operation in the morning on the operation day on an empty stomach. All operations were carried out under local anaesthesia. Then patients left the operating room on their own and were observed in the Centre until a follow-up visit on the next day. Oral feeding was applied directly after operation. No additional analgesics were administered after operation. The patients were neither provided with any antibiotics nor anticoagulants. All patients answered questions included in a specifically elaborated questionnaire. Data were also collected that involved the type of operation performed and a classification of hernias according to the European Hernia Society (EHS) (9). All operated patients were informed about the need to report to the Center in case of any complications. At the same time, it was determined that surgeons from Poland would be informed by e-mail by local staff, on a regular basis, about any com-

plications, also after they would return to Poland.

RESULTS

Surgical repairs were performed in 87 patients, aged 26 to 70 (mean 52.8 years; SD 10.3), in whom 98 inguinal hernia operations were carried, in total. The majority of operated patients had inguinal hernia located on their right side only – 48 (55.2%), on the left side only – 28 (32.2%), and bilateral hernia was operated in 11 patients (12.6%). A detailed classification of operated inguinal hernias is presented in tab. 1. The study group consisted of 74 men (85%) and 13 women (15%). The majority of patients came from neighboring villages (55 patients; 63%) located at a distance of 3 to 90 km (15.5 km) from Tamale, but only 14 people lived more than 20 kilometers from the facility. The remaining 32 patients (37%) came from the same town in which the treatment was carried out. Patients reported the long-term presence of hernia symptoms – from one to 7 years (mean 3.4 years, SD 1.4). In most patients, hernia occurred more than 3 years earlier (61 patients; 70%). Only 11 patients (12.6%) sought assistance during their hernia occurrence – in two cases they went to local healer and 9 patients reported to a public hospital. All those patients quoted insufficient finances as the reason underlying the fact that they had not had an operation performed earlier, though two persons who had reported to a hospital before had been fully insured. 15 patients from all operated patients (17.2%) declared that they had health insurance. Only 7 patients (8%) felt considerable pain before their operations. Recurrent hernia was the reason for operation in 7 cases (7%; n=98), including one woman. 6 patients were diagnosed with relapsing indirect hernia (L3 in 4 cases and L1 in 2 cases), and one person had direct hernia (M3). Extended scrotal hernias were diagnosed in 17 cases (17%; n=98).



Fig. 1. Bilateral inguinal hernias in patient in Ghana. Visible clinical symptoms of undernourishment



Fig. 2. The surgical team during inguinal hernia operation. Poorly equipped operating theatre, among others, there is no electrocoagulation device

Table 1. Type of hernias according to EHS classification (n=98)

	Total	1 <1,5 cm	2 1,5-3 cm	3 >3 cm
L (indirect hernia)	70	30	23	17
M (direct hernia)	28	15	6	7

For each operation the same quantity of anesthetics was used – 10 ml 2% lignocaine, which was administered by means of a local intradermal injection 10 minutes before operation. Additionally, the same injection contained 0.5 mg of adrenaline, used to improve hemostasis if no electrocoagulation was available. During an operation, a surgeon had additional syringe with 5 ml 2% lignocaine at his disposal, which was used if the patient reported intraoperative complaints. 23 patients (26.4%) reported that they felt pain during operation – in 2 patients (2.3%) the pain was weak, 20 (20.3%) – moderate, and one patient (1.15%) reported interoperative pain as severe. The other patients (73.6%) denied pain during operation. In the majority of cases (in 93 cases; 95%), the surgical repair was performed with the use of Lichtenstein method. In the remaining cases (5; 5%) – with the use of Desarda method (in 1 woman and 4 men with L2 and M2 hernias).

There were no intra-operative complications. All patients were discharged the next day after surgery. During discharge, haematoma was detected in 4 patients. One patient required to have it removed by means of a puncture. 5 patients had oedema of a testicle and testicular cord. One patient returned on the fourth day after operation with infection in her wound, which required wound revision and mesh explantation. According to the data obtained from electronic correspondence from the staff taking care of the patients in Ghana, during 4 weeks after operations, no additional complications were ascertained.

DISCUSSION

The majority of epidemiological data involving patients operated in Ghana are similar to the results presented by other authors and overlap with the results documented among patients in Europe. The differences involve, first of all, excess weight or obesity and smoking, which are almost non-existent among poor people living around Tamale. It constitutes an acknowledged factor which affects minimization of the risk involving injection complications following synthetic material implantation (10). There is greater incidence of scrotal hernia in Ghana, when compared with the developed European countries. According to

Kingsnorth, scrotal hernias constitute 2/3 of all cases in Ghana, while in Great Britain, they constitute only 6.8% (4). At the same time, the described material shows no cases of scrotal hernia sized over 10 cm (n=101) in patients in Europe. In our material from Ghana we ascertained scrotal hernias in 17% cases, which is similar to the results obtained in the Municipal Hospital in Siedlce, collected in the KROPP record – 14.9% (n=517), only almost 5% were scrotal hernias sized over 10 cm (11). It may be then stated that greater experience of Polish surgeons in the treatment of extensive scrotal hernias, when compared with doctors from Western Europe, is more favourable from the point of view of entities organizing humanitarian medical missions of that profile. Long duration of the disease since the moment clinical symptoms appear, which in our case lasted 3 years, may affect the hernia extensiveness. It overlaps with the observations made by Sanders, who diagnosed hernias lasting over 12 months in 85% patients, and for more than 3 years in 37% patients (6).

There are only 9 doctors per 100,000 inhabitants in Ghana. In the country inhabited by almost 25 million people, only 2000 doctors work in state public hospitals (7). During three years since the time of medical studies completion in the Sub-Saharan countries, 2/3 of all doctors leave their home countries permanently to work in Europe, America or Australia (12). Whereas, these are not surgeons who deal with surgical treatment there, since they are rare, but general practitioners and auxiliary staff (13). According to estimates by WHO, it is immediately required to train and employ a million qualified health care professionals in Africa in order to stop the aggravating personnel crisis in health care (14). The approaching humanitarian catastrophe involving access to medical care in developing countries is additionally aggravated because of insufficient medical infrastructure, inadequately equipped centres and lack of finances to purchase medicines (15).

In inguinal hernia surgical repairs, local personnel in Sub-Saharan Africa use traditional operation techniques, mainly the Bassini, Girard and Halstead methods. Recently, in Shekhinah Clinic in Tamale, the said methods are replaced by operations with the use of Desarda method introduced by a local doctor, which seems to meet the criteria required from a technique that may be used permanently in

local personnel's armamentarium. This means, this method is simple in technical terms, repeatable, universal for various types of hernias, does not need to use a mesh, the access to which is considerably limited here, with satisfactory long-term results. During operations performed in the course of the mission by Polish doctors, however, mainly the Lichtenstein method was applied. It was assumed that this technique should increase the confidence of local personnel – previously limited – towards methods using meshes and familiarize them with details associated with the operation perceived throughout the world as a 'golden standard.' In the light of current literature, it seems that the main purpose of short-term medical missions in developing countries should be, first of all, training of local staff. It results from the fact that huge global costs of humanitarian actions (250 million dollars per year and thousands of hours of volunteers' work) could be used more effectively by local governments, provided that sufficiently trained local personnel were on site (16). Wang draws attention to the fact that even 2-day long training involving tension-free methods among local staff using traditional methods of operations would make it possible to achieve satisfactory long-term results, leading to more and more frequent application of the said technique. Unfortunately, the fact that it is not commonly possible to finance the costs of mesh purchase and that there is no distribution network, limits the propagation of the method in question. It seems that similar situation occurs in case of other tension-free techniques, such as, among others, Valenti (PAD), UHS, Rutkow or Kugel methods (18, 19). Taking into account the fact that there are no meshes, local personnel use, as a matter of necessity, low-tension and tension methods. Among these methods, the Shouldice technique is recommended. However, in face of technical difficulties in the correct use of this method, it seems easier to apply the Desarda method, taking into account its satisfactory long-term results (20)

Despite the benefits of local anesthesia, it is still not commonly used in everyday surgical practice. Nevertheless, in the conditions occurring in developing countries, it constitutes the most optimum type of anesthesia. It allows to fully mobilize patients immediately after operation and may be performed directly by the operating surgeon. In case of patients operated during the mission in Ghana, each time

a small quantity of anesthetic was used (max. 15 ml), which, after all, ensured proper comfort for patients. Only one patient reported pain during operation. The reason of such high analgesic efficiency of so small dose of anesthetic may be, among others, the common malnutrition among patients in Ghana. Similar observations were presented by Kulacoglu, who achieved analgesic effect after administration of 19.79 ml of the solution, on average, ascertaining significantly smaller volume of the medicine to be used in the group of patients with BMI below 25 (21). Thin subcutaneous adipose tissue enables full infiltration of this layer with the use of even a small quantity of lignocaine, thanks to which the remaining part of the medicine could be administered under the abdominal external oblique muscle aponeurosis, deep ring and pubic bone tubercle. The time of operation did not exceed 60 minutes, which also constitutes a favourable factor improving the efficiency of local anesthesia.

During operations performed in Ghana, visibly lower distance between inguinal canal structure was observed, when compared with patients in Europe. It results from anatomical differences in the construction of structures of pelvis between black and white races. Patriquin quotes statistically characteristic lower ($p < 0.001$) all twelve standard anatomical dimensions in pelvis in black race (22). It seems that among these parameters, the situation of an inguinal canal is reflected the best by the so-called pubic distance – which means the distance between the upper edge of an iliac joint acetabulum and the most upwardly and medially situated point of the pubic bone crest. On the basis of measurements performed on 400 skeletons, it amounts in men of white race 101.65 mm, and in men of black race – 93.26 mm (in women – 102.21 and 93.31, respectively). The area of posterior wall of the inguinal canal in white race that should be protected was determined as 4x5.4 cm (23). Unfortunately, we do not have relevant data from literature involving also the black race. Nevertheless, the difference of almost 1 cm translates in both races into visible reduction of distance between the deep inguinal ring and pubic bone tubercle, thus also the area of a posterior wall of the inguinal canal (appr. 20-25%). Undoubtedly, it affects the mesh size that should be used for inguinal hernia operation. Consequently, there may be no need to use such extensive meshes in black

race as in case of patients in Europe (24). Adequately trimmed meshes sized 7x12 cm were used in our material. At the same time, it is possible to make shorter skin cuts, which may also result in the reduction of the percentage of complications related with wound infections.

CONCLUSIONS

Inguinal hernia commonly found in Ghana is a major issue for the under-financed and

inefficient health care system. Humanitarian medical missions can help to improve the treatment results, as long as they are carried out periodically and allow for training of local personnel. Scarce equipment of medical facilities in Ghana does not constitute a significant difficulty in performing the Lichtenstein repair under the local anesthesia. It is necessary to perform anthropometric examinations of the inguinal canal in Africans in order to modify the European model of the hernia mesh size.

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