Purpose: The aim of this report was to describe a rare case of a male patient with dry umbilical hernia with Meckel's diverticulum adherent to the neck of hernia sac. The patient's history, results of physical examination, laboratory testing, intraoperative findings, treatment method and postoperative course are summarized in details in this report. Follow-up visits were performed 14 days, one month and one year after the operation. Case report: A 35-year-old overweight Caucasian male patient (initials: D-B, body weight 90 kg, height 172 cm) was admitted to the hospital on 2nd April 2009 with reducible umbilical hernia for elective surgical treatment. The patient was operated on in the Specialist Diagnostic and Therapeutic Centre Medicina in Cracow and discharged from the hospital on fourth postoperative day. This case is compared with a few similar cases which have been described in the literature till now - all of these reports dealt with strangulated umbilical hernias but not reducible one. The patient underwent elective operation performed on the day of admission. Antibiotic prophylaxis included single dose of pefloxacine (400 mg intravenously) administered just before start of the operation. Subarachnoid anaesthesiology was applied 15 minutes before start of the operation. The procedure lasted 75 minutes. Hernia sac was dissected and opened. In the hernia neck adherent Meckel's diverticulum was found. It was localised 80 cm from ileocecal valve and its length was 45 millimetres. During dissection process the diverticulum was injured in the apical region so cuneiform resection of the ileum with Meckel's diverticulum was performed. Ileum was sutured with two layers of absorbable sutures. The tissue defect in umbilical region was repaired primarily with onlay synthetic mesh prosthesis (polypropylene mesh, size 7x12 cm). Conclusions: 1) Adherent incidental Meckel's diverticulum in a sac of reducible umbilical hernia is a very rare finding. 2) During Wstęp: Celem niniejszej pracy jest opis rzadkiego współlistnienia przyrośniętej przepukliny pępekowej i uchyłka Meckela zlokalizowanego w obrębie szyi worka przepuklinowego. Publikacja zawiera szczegółowy opis historii choreby, wyniku badania fizykalnego i istotnych badań laboratoryjnych, obrazu śródoperacyjnego, sposobu leczenia i przebiegu pooperacyjnego. Wizyty kontrolne po zabiegu przeprowadzono po 14 dniach, po miesiącu i po roku od operacji. Opis przypadku: Otyły, 35-letni mężczyzna (iniciały D-B, waga 90 kg, wzrost 172 cm) został przyjęty do szpitala w dniu 2 kwietnia 2009 roku z powodu odprowadzalnej przepukliny pępekowej celem planowego leczenia operacyjnego. Po zabiegu chorego wypisano do domu w 4 dobie pooperacyjnej. Dokonano porównania analizowanego przypadku z kilkoma innymi opisanymi w literaturze, które dotyczyły jednak uwiśniętej a nie przyrośniętej przepukliny pępekowej. Operację wykonano w dniu przyjścia do szpitala. W ramach profilaktycznej, operację podano na dawkę pefloksacyny tuż przed rozpoczęciem operacji. Zabieg trwał 75 minut. Worek przepuklinowy otwarto po jego wyparowanie. W szycie worka stwierdzono przyrośnięty uchyłek Meckela długości 45mm i położony w odległości 80 cm od zastawki Bauhina. W trakcie zabiegu doszło do uszkodzenia uchyłka Meckela, w jego szczyciowej części. Wykonano klinową resekcję jelita cienkiego wraz z uchyłkiem. Jelito zesztywo dwoma warstwami szwów wchłanialnych. Ubytek w powłokach zaopatrzyto siatką z materiału syntetycznego umieszczoną nad przednią blaszką mięśni prostych (materiał onlay, siatka polipropylenowa wielkości 7x12 cm). Wnioski: Przyrośnięta przepuklina pępekowa, której zawartość stanowi uchyłek Meckela występuje rzadko. 1. Podczas planowych i doraźnych operacji przepuklin pępekowych należy pamiętać, że zawartość worka może stanowić uchyłek Meckela. 2. Jeżeli uchyłek Meckela notatki kliniczne — clinical notes
umbilical herniorrhaphy (elective or urgent) the presence of Meckel diverticulum in hernia sac should be taken into consideration. 3) If Meckel diverticulum is adherent to the hernia sac it requires careful dissection and resection of the diverticulum in selected patients. 4) When there is a tumour palpable in the wall or basis of Meckel diverticulum segmental resection of the small intestine with appropriate margins should be performed.

Introduction

A protrusion through the anterior abdominal wall fascia is described as a ventral hernia. These hernias are categorized as spontaneous or acquired or by their location on the abdominal wall. Umbilical and epigastric hernias constitute 10% of all abdominal wall hernias. The umbilicus is formed by the umbilical ring of the linea alba. Congenital umbilical hernias in infants are common, complications related to them are rare and hernias usually close spontaneously by the age of 2 years. Those that persist after the age of 5 years are frequently repaired surgically. Acquired umbilical hernias in adults are more frequent in women and in patients with conditions that increase intra-abdominal pressure, such as obesity and ascites. Strangulation of umbilical hernia is unusual but rupture or strangulation may occur in patients with chronic ascites. Hernia repair is indicated in adults who have symptoms, a large tissue defect, incarceration or ascites. The Mayo vest-over-pants technique employs imbrication of superior and inferior fascial edges. The appropriate surgical treatment of umbilical hernia include primary closure after separation of the sac from the overlying umbilicus and the surrounding fascia; prosthetic mesh is needed when defects’ diameter exceeds 3 cm. Options for mesh implantation include bridging the defect, placing a preperitoneal underlay of mesh reinforced with suture repair, or placing it laparoscopically. There is no unequivocal opinion on the most appropriate method of umbilical hernia treatment.

A hernia involving a Meckel’s diverticulum is named Littre’s hernia after the French physician and anatomist Alexis Littre (1658-1726) who described the incarceration of a diverticulum in an inguinal hernia in the year 1700 [10]. Meckel’s diverticulum is the most common congenital abnormality of the small bowel, occurring in autopsy records in up to 4 % of the general population, more frequently in men (60%) than in women. Moreover in ca 30% of patients other anomalies are present. The length of Meckel’s diverticulum varies from 0.5 cm to 85 cm although the mean length reported is 5 cm [13]. Johann Friedrich Meckel the Younger thoroughly described the remnant of the omphalomesenteric (vitellointestinal) duct located on the antimesenteric border of the ileum in 1809 [9]. Earlier this anatomic structure was mentioned for the first time by a German surgeon Wilhelm Fabricius Hildanus in 1598 [7,6]. It is most commonly discovered as an incidental finding on laparotomy or laparoscopy and is a quite rare cause of clinical symptoms in the adult population but the estimated lifetime risk of developing a condition that requires surgery reaches 6.4% [5]. A diagnosis of symptomatic Meckel diverticulum is difficult to establish on the basis of patient’s history, physical examination, and laboratory testing. The typical complications of this entity include: haemorrhage, diverticulitis, ulceration, perforation and the most common - intestinal obstruction observed in 20% of patients with symptomatic Meckel diverticulum [8]. Anomalies in umbilical region occur in 10% of patients with Meckel diverticulum and consist of cysts, fistulas and fibrous bands between the umbilicus and Meckel’s diverticulum. A fibrous cord found at laparotomy or laparoscopy ought to be excised because of the possibility of volvulus and herniation [15]. A hernia that contains a Meckel’s diverticulum is referred to as Littre’s hernia. The majority of Littre’s hernias include inguinal or femoral ones [18].

Discussion

Meckel’s diverticulum represents a true diverticulum of the small intestine containing all three layers of the bowel wall. It develops if the omphalomesenteric duct, which connects the developing midgut with the yolk sac, fails to obliterate, which occurs by the eighth week of gestation under normal conditions [18]. Heterotopic tissue (i.e. gastric, pancreatic, duodenal, carcinoid etc.) is present in approximately 50% of patients [20]. Most Meckel’s diverticula are localised in the ileum within 100 cm of the Bauhin valve. Patients with Meckel’s diverticulum may develop different complications including: intestinal obstruction, ulceration, bleeding, diverticulitis and intussusception. Most complications occur in patients younger than 10 years old. In a study on 1476 patients with Meckel’s diverticulum operated on in the Mayo Clinic between 1989 and 2002 John Park et al. reported that only 16% of all patients with Meckel diverticulum were
symptomatic and that 29% of all Meckel diverticula contained ectopic or abnormal tissue. In these patients the most common presentation in an adult was bleeding and in a child obstruction (but authors included to paediatric group only patients < 11 years old) [14].

The umbilical ring in infants diminishes in size and eventually closes, in 95% of cases small defects (<1cm) close spontaneously by 5 years of age [12]. The adult umbilical hernia is acquired in almost 90% of cases and protrudes through the umbilical canal bordered by the umbilical fascia posteriorly, the medial edges of the two rectus sheaths laterally and the linea alba anteriorly. It develops secondary to increasing intra-abdominal pressure. Predisposing factors include obesity, hepatic cirrhosis with ascites, multiple pregnancies, large abdominal tumours, COPD and benign prostatic hypertrophy. Adult umbilical hernias are most likely to occur in women between the fifth and sixth decade of life. Umbilical hernia in adults should be treated surgically and the preferred methods are mesh plug or a mesh sheet depending on the size of the tissue defect [16]. Arroyo et al. compared primary tension repair with synthetic mesh hernioplasty in 200 adult patients with a primary umbilical hernia followed for 64 months and observed significantly higher hernia recurrence rate after suture repair (11%) than after mesh repair (1%) [2].

There are different opinions on treatment of Meckel's diverticulum. Absolute indications for resection include: intestinal obstruction, ileo-umbilical fistulas and haemorrhage. In case of asymptomatic and incidentally recognized Meckel's diverticulum resection should be performed when the diverticulum is inflamed, fibrous bands are detected, its length exceeds 2 cm or the patient's age is below 40 years. Possible surgical procedures includes excision of the diverticulum with suture closure of its base, segmental resection of the ileum with diverticulum and suture closure or wedge resection of the intestinal wall. Resection without opening the bowel lumen is possible when staplers are used.

In the patient described in this paper two indications for Meckel's diverticulum resection existed: age below 40 years and length of 4.5 cm. Additionally intraoperative injury to the diverticulum required excision to prevent postoperative complications. Wound infection observed in this patient may have been connected with the opening of small intestine lumen. On the other side there was not substantial contamination of peritoneum. The reported morbidity rate after resection of asymptomatic Meckel's diverticulum is only 2%, late postoperative complication rate is 2%, and the mortality rate only 1%. On the other hand in a study from Mayo Clinic, with 1476 patients included, morbidity (20%)
and mortality (3%) from resecting asymptomatic Meckel's diverticulum were even higher than morbidity (13%) and mortality (0%) in the symptomatic group. Some authors emphasize that resection of asymptomatic Meckel diverticulum can protect patients from possible complications [11,3]. Nevertheless most surgeons do not resect Meckel diverticulum with a wide neck because the risk of obstruction or twisting is relatively low. Thickening, inflammation or suspicion of ectopic tissue oblige the surgeon to perform local or segmental resection. None of the conditions mentioned above were noted in the patient described in this paper.

In the literature there are only few descriptions of umbilical hernia with Meckel diverticulum in a hernia sac. Majority of cases reported previously differ from the patient described in this paper because they deal with:

- strangulated hernia with Meckel diverticulum
- symptomatic patients
- women.

One of the first reports on strangulated umbilical hernia containing Meckel's diverticulum was given by Italian author A. Volpe in 1962 [19]. Similar case described Albert Tiu and Dominic Lee from John Hunter Hospital, Newcastle, Australia in 2006 [17]. They operated on an overweight 55-year-old Caucasian woman with no previous abdominal surgery who was admitted to the emergency department with a 6-hour history of abdominal pain. Accompanying symptoms included nausea and vomiting without fever. After opening the hernia sac, a discoloured, non-perforated Meckel's diverticulum was noted and resected with hand-sewn end-to-end anastomosis of the small bowel. The tissue defect was repaired with interrupted sutures and reinforced with a synthetic mesh. Patient's recovery was uneventful.

Another case of woman with strangulated umbilical hernia described in our paper occurred in 2010 by Ilker Sengul et al. from Turkey. The 42-year-old patient had a gangrenous Meckel's diverticulum of 7 cm in size in a umbilical hernia sac and was treated by dissection of fibrous bands and excision of the diverticulum. The woman had a mass on the umbilical area which increased its size during 5 years, pain intensity in the area increased significantly during 2 weeks before admission. In quite long follow-up (3 years), there was neither any complication nor recurrence of hernia.

Strangulated umbilical hernia with Meckel's diverticulum was reported in children as well. Authors from Togo published in 2009 a paper on umbilical strangulated hernia in 18 month girl with sac containing a completely gangrenous Meckel's diverticulum. Clinical symptoms suggesting upper intestinal strangulation lasted in this patient seven days. The girl was febrile and hernia size was 4 cm. On operation completely gangrenous Meckel's diverticulum was noted, it was localised 12 cm from the ileocaecal valve and had length of 1.5 cm. Segmental resection of 8 cm of the small intestine at both sides of the diverticulum was performed with following hand-sewn end-to-end anastomosis. Hernia was repaired with out mesh prosthesis and patient was discharged home on seventh postoperative day. The authors conclude that adequate bowel resection of the segment bearing the diverticulum is advisable if the latter is gangrenous [1].

In the literature we found only one description of dry umbilical hernia with adherent Meckel's diverticulum. W. M. Castleden from Royal Perth Hospital in Australia reported in 1970 a case of a 61-year-old female with small umbilical hernia (4 cm in diameter). In contrast to our patient this woman had irreducible and symptomatic hernia: she experienced intermittent attacks of periumbilical pain and discharge of serosanguineous fluid. The woman underwent elective operation. After opening the hernia sac, the densely adherent Meckel diverticulum was inadvertently damaged - similar injury was done to our patient. The diverticulum was excised with a wedge of adjacent ileum, the bowel was sutured with two layers of catgut and hernia was repaired with interrupted non-absorbable sutures. Just as in our patient the histologic examination revealed Meckel diverticulum with no evidence of heterotopic tissue [4].

John Park et al. having analysed all patients with Meckel's diverticulum operated on in Mayo Clinic concluded that all incidental diverticula fulfilling one of following criteria should be removed: age below 50 years, male sex, length greater than 2 cm and ectopic or abnormal features within the diverticulum. They showed that when 1 criterion was met the proportion of symptomatic Meckel diverticulum was 17% but when 4 criteria were met the proportion increased to 70%. The patient described in our paper fulfilled 3 of the criteria mentioned above so the diverticulum should be resected even without intraoperative injury. Cullen et al. summarizing a population based study recommended resection of Meckel's diverticulum in all patients younger than 80 years [5]. It remains unresolved whether Meckel's diverticulum found in umbilical hernia sac should be always resected. In asymptomatic patient with low risk of complications associated with the presence of diverticulum resection is probably not necessary. The possibility of receiving evidence based recommendations is limited due to very low incidence of such cases so the decision on treatment should be based on own surgical experience.

Conclusions

1) Adherent incidental Meckel's diverticulum in a sac of reducible umbilical hernia is a very rare finding.

2) During umbilical herniorrhaphy (elective or urgent) the presence of Meckel diverticulum in hernia sac should be taken into consideration.

3) If Meckel diverticulum is adherent to the hernia sac it requires careful dissection and resection of the diverticulum in selected patients.

4) When there is a tumour palpable in the wall or basis of Meckel diverticulum segmental resection of the small intestine with appropriate margins should be performed.

References


