Introduction

Treating elderly and old people for spine pathologies becomes ever more vital every decade due to the demographic processes at play in our modern society; and this problems gains not only medical, but social and ethic dimensions [1, 2]. Its essence lies in the difficulty of adequate evaluation, differential diagnostic of natural involutionary changes, as well as in choosing optimum treatment tactic for every individual patient [3–6]. Moreover, the surgery risk in this age group is much higher than in the younger one, which is why experts argue as to the best treatment options [7–9].

It is known that while the degenerative cascade progresses at the lumbar spine, older people suffer from stenosis and degenerative segmental instability [9]. There is a large number of surgery options for spinal disc herniations, tentatively divided into decompressive (discectomy, microdiscectomy, laminectomy, hemilaminectomy, interlaminectomy, facetectomy), rigid stabilizing (transpedicular fixation, translaminar fixation, PLIF, TLIF, ALIF, DLIF), dynamic stabilizing (DIAM, Coflex, spongy titanium nickelide intertranspinal implants etc.) and decompressive-stabilizing interventions [10 – 13].

Among these patients, there is a recent rise in popularity of percutaneous treatments, such as epidural angiolysis, epidural steroid injections, percutaneous nucleotomy, Stryker-decompresor, laser discectomy etc. However, there is no consensus as to the useful-
ness of these treatments for the elderly and old patients, and the long-term outcomes are not always satisfying.

In order to understand the range of problems bringing about negative surgical outcomes among the elderly and old patients, we performed a retrospective analysis of repeated surgical interventions among the population who has already undergone operations of herniated intervertebral discs and compared causes of negative primary surgical outcomes among the young and older.

The purpose of the study is to determine the causes of negative outcomes of herniated intervertebral disc surgical interventions among the elderly and old patients compared with young patients. It helps choosing correct surgical tactics and preventing future occurrence of complications.

Materials and methods

Objects of research are the patients who have undergone herniated intervertebral disc surgical interventions at the lumbar spine.

Materials of the study were the reports of 170 patients having a history of herniated intervertebral disc operations at the lumbar spine who have undergone a repeated surgical intervention. Those patients had various degenerative clinical lumbar conditions. All the patients were operated at the Regional Orthopedic, Traumatology and Vertebrology Center “Rivne Regional Clinical Hospital” municipal institution from 2000 to 2018. All the patients had a history of herniated intervertebral disc surgical interventions at various medical institutions of Ukraine, 3 months to 7 years prior to the research. People of older age group (60 years and over) amounted to 78 (45.8 %) while those of younger age group (18-59 years) – to 92 (54.2 %) (Table 1).

The majority of young (70.6 %) and older (53.8 %) patients had a history of microdiscectomy. Microdiscectomy with a stabilization of injured segment was performed in 11.9 % of young and 10.3 % of elderly and old people; wide decompression with a massive removal of posterior structures (pedicle, zygapophysial joints) and discectomy was performed in 6.6 % of young and 11.5 % of elderly and old people. 10.9 % of young and 24.4 % of older people had a wide decompression and posterior stabilization. (Table 2).

Patients were admitted with various complaints, namely a recurring herniated intervertebral disc at the same level, herniated intervertebral disc at the adjacent level, spinal locomotor segment instability at the operated or adjacent level, epidural fibrosis with spinal canal stenosis, degenerative central and/or foraminal stenosis, metal construction failure, degenerative scoliosis. Reasons for a repeated surgical intervention are presented in Table 3.

Clinical case. Segmental instability developing after microdiscectomy at L₄-L₅, L₅-S₁ levels 2 years after the surgical intervention (Fig. 1a,b) requiring transpedicular fixation and autometal-spondylosis (Fig. 1 c,d).

Results and discussion

At the operated level, recurring herniated intervertebral disc was found in 61 % of younger patients and 4 times as rarely (14.1 %) in the older ones. At the adjacent level, recurring herniated intervertebral disc was also more prevalent among the younger patients (10 %) than in the older ones (3.8 %). This occurrence may be explained by the advancing dehydration of intervertebral disc and significant reduction of interbody space height. Young people have greater volumes of disc matter resulting in new sequesters.

| Table 1. Sex-based distribution of patients |
|-------------------------------------------|
| **Sex** | n/young | n/older |
|---------|---------|---------|
| Men     | 43 (46.7 %) | 33 (42.3 %) |
| Women   | 49 (53.3 %) | 45 (57.7 %) |
| Total   | 92 (100 %) | 78 (100 %) |

| Table 2. Primary intervention-based distribution of patients |
|------------------------------------------------------------|
| **Primary intervention** | n/young | n/older |
|--------------------------|---------|---------|
| Microdiscectomy (interlaminectomy, partial facetectomy)     | 65 (70.6 %) | 42 (53.8 %) |
| Microdiscectomy (interlaminectomy, partial facetectomy) + posterior autometal-spondylosis | 11 (11.9 %) | 8 (10.3 %) |
| Wide decompression (hemi-, laminectomy, facetectomy) + discectomy | 6 (6.6 %) | 9 (11.5 %) |
| Wide decompression (hemi-, laminectomy, facetectomy) + discectomy + posterior autometal-spondylosis | 10 (10.9 %) | 19 (24.4 %) |
Degenerative scoliosis was observed in 3.8% of older patients and no younger ones; instability at the operated level was observed twice as often in the older patients (30.8%) than in the younger ones (13%) while instability at the adjacent level was observed 5 times as often in the older patients (15.4%) than in the younger ones (3.2%). We might explain it by the fact that with advancing age degenerative changes affect all the spinal segments while in the younger people they are localized in the anterior locomotor complex.

Stenosis requiring repeated intervention, namely foraminal stenosis (younger patients – 3.2%, older ones - 9%), central stenosis (older patients – 10.3%), epidural fibrosis with cicatrical stenosis (younger patients - 5.4%, older ones – 7.7%), was typical mainly of the older population. It might be due to a higher level of anti-inflammatory cytokines in the elderly and old patients.

Metal construction failure in the older population was mainly due to lysis around the screws (3.8%) than to a break-down, while in the younger one – mainly to a break-down (4.2%). It might be associated with a worse bone quality of older patients.

Conclusions

1. The most common reason for repeated intervention in older patients is instability at the operated and adjacent levels. It encourages surgeons to use stabilizing intervention more often and resort to a detailed planning as to a stabilization level. Older patients suffer from stenosis more often that the younger ones, thus requiring a wider decompression.

2. To prevent the epidural fibrosis, it is necessary to use non-invasive surgical procedures with a minimum intra-surgical blood loss. Besides a discectomy, older patients often require a degenerative deformation correction.

3. In case of a severe osteoporosis, to prevent the metal construction failure, surgeons should use special cement-augmented implants to improve the “implant-bone” contact.

### Table 3. Reasons for repeated intervention-based distribution of patients

| Principal reason of repeated intervention | n/young | n/older |
|------------------------------------------|---------|--------|
| Recurring herniated intervertebral disc at the operated level | 56 (61%) | 11 (14.1%) |
| Herniated intervertebral disc at the adjacent level | 9 (10%) | 3 (3.8%) |
| Instability at the operated level | 12 (13%) | 24 (30.8%) |
| Instability at the adjacent level | 3 (3.2%) | 12 (15.4%) |
| Epidural fibrosis, cicatrical stenosis | 5 (5.4%) | 6 (7.7%) |
| Degenerative central stenosis | – | 8 (10.3%) |
| Degenerative foraminal stenosis | 3 (3.2%) | 7 (9%) |
| Metal construction failure (break-down) | 4 (4.2%) | 1 (1.3%) |
| Metal construction failure (lysis around screws) | – | 3 (3.8%) |
| Degenerative scoliosis | – | 3 (3.8%) |

![Fig. 1. X-rays after the primary intervention (a, b) and after a repeated intervention at L₄-L₅, L₅-S₁ levels (c, d)](image-url)
Прогнози щодо подальшого розвитку в галузі. У результаті, отримані результати дозволять у подальшому вибрати правильну хірургічну тактику та зміни методик, що призведе до збільшення точності та ефективності хірургічного лікування.

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Причини повторних оперативних вмешаньнях у пацієнтів, перенесених хірургичне лікування гріж межпозвоночних дисков поясничного отрібового
позвоночника

Резюме. Актуальність. В статті представлено ретроспективний аналіз причин, призводящих до противідних результатам хірургичного лікування пожилого населення з гріжами межпозвоночних дисков на рівні поясничного отрібового позвоночика. Цель. Опреділення причин негативних результатів хірургичного лікування гріж межпозвоночних дисков у лиць вікових і старческого віку по порівнянню з молодими пацієнтами, щоб допомогти в дальньому вибрати правильну хірургічну тактику і зміцнити відповідальність епізодів.

Матеріали і методи. Проведено ретроспективний аналіз хірургичного лікування гріж межпозвоночних дисков поясничного отрібового позвоночика у 170 пацієнтів. Групу молодих людей складали 92 пацієнта, групу лиць вікових і старческого віку (60 років і старше) — 78 пацієнтів. Перша операція по поводі гріж межпозвоночного диска була проведена в період від 3 місяців до 7 років до виконання різних процедур у стентарних умовах України. Результати. Рецідив гріж диска на тому ж рівні обнаружен у 61% молодих пацієнтів і в 4 рази частіше (14,1%) у пожилого. Грижа диска на смежному рівні виявлена також у молодих пацієнтів (10%), але в старшій віковій категорії (3,8%). Даний факт автори свідчать, що з віком межпозвоночний диск збільшується у гідротозовому стані, а висота міжтелевого проміжку значно зменшується, оскільки в стабільному віці матеріал диска значно менше, що збільшує ризик виникнення нових секвестрів.

Висновки. Результати проведеного дослідження показують, що причини повторних оперативних хірургічних вмиканьнях у пацієнтів, перенесених хірургичне лікування гріж межпозвоночних дисков поясничного отрібового позвоночника, відрізняються від вікової категорії, що призводить до нестабільності на оперуваному і смежному рівнях, що обумовлює хірургів до збільшення оперативної техніки і детальної перебільшання у висновках вибору рівня стабілізації. У старшій віковій категорії різко збільшується процес стенозування, тоді як воно менше в молодих пацієнтів.

Ключові слова: гріжа межпозвоночних дисков, повторне хірургичне лікування, пожилій вік