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***Review Article***

# INVASIVE PROCEDURES WITH QUESTIONABLE INDICATIONS: REPORT FROM RUSSIA

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**ABSTRACT**
The main topic of this review is invasive procedures used in Russian healthcare without sufficient indications. More examples and illustrations are in a recently published book. Recommendations are generally avoided here. Among others, the following is discussed: the overuse of gastrectomy for peptic ulcers, of thoracic surgery for bronchial asthma and other respiratory diseases, spleno-renal anastomosis in diabetes. Considering the breast cancer incidence, millions of women in the former Soviet Union underwent Halsted and lately of Patey mastectomy with removal of pectoral muscles without indications, often sans informed consent. The training of medical personnel has been one of the motives. This topic is interconnected with certain features of Russian healthcare, namely paternalism, authoritative management style, occasional disregard for the principles of informed consent, professional autonomy and scientific polemics. In conditions of paternalism, misinformation of patients, persuasion and compulsory treatments are regarded to be permissible. Considering shortcomings of medical practice, research and education, a simple increase in funding is unlikely to be a solution. Measures for improvement of the healthcare in Russia must include participation of authorised foreign advisors. Unfortunately, current international tensions are not contributing to the cooperation in humanitarian affairs.

***Keywords**: Breast cancer, Peptic ulcer, Diabetes mellitus, Asthma, Surgery, Medical ethics*

## INTRODUCTION

The autocratic management style discourages criticism. In the healthcare, attributes of this style include a paternalistic approach to patients, bossy management, and paternalism with occasional disregard of informed consent (Mikirtichan *et al.,* 2022). Appart from the topics delineated here, the following has been discussed in the recently published book: the overuse of thoracic surgery in tuberculosis, excessive and compulsory treatments of alcoholics, overdiagnosis and overtreatment of thyroid cancer. Endocervical ectopies (named pseudo-erosions in Russia) have been routinely cauterized without cytological tests; Pap-smears for early detection of cervical cancer have been performed infrequently and not up to the international standards, cervical cancer being diagnosed relatively late. Justifications of surgical hyper-radicalism could be heard in private conversations among medics: "The hopelessly ill are dangerous" i.e. may commit reckless acts undesirable by the state. For example, glioblastoma patients were routinely operated on, while it was believed by some staff that the treatment was generally useless, just forcing many patients to spend the rest of their lives in bed (Jargin, 2024). The training of medical personnel under the imperative of readiness for war has been one of the motives. Thanks to the Internet, foreign literature is available in Russia these days, many guidelines being adjusted to international patterns. However, some published instructions have remained without due commentaries. Finally, the obstacles to the import of drugs and medical equipment should be mentioned. Domestic products are promoted sometimes despite questionable quality and possible counterfeiting (Senokosova, 2019).

## *BREAST CANCER*

According to the author's estimates after a practice of pathology abroad (repeatedly during 1990-2008), an average size of malignant tumours in surgical specimens was larger in Moscow clinical centres than in

hospitals of Western Europe, which reflects the timeliness of cancer diagnostics. Another difference: almost all mastectomy specimens abroad were without muscle. The worldwide tendency towards a more sparing breast cancer management was not followed in the former Soviet Union (SU) for decades. In the 1980s and decreasingly in the 1990s, the Halsted procedure with the removal of both *Pectoralis* muscles was a predominant method of breast cancer (BC) management (Irov, 1989; Letiagin, 1992; Levin and Miasnikova, 1992; Pereslegin and Nikitina, 1990; Pronin *et al.,* 1990); it was presented as the main treatment modality of BC in some textbooks and monographs published after the year 2000 (Kazachenok and Baryash, 2005; Kovanov and Perelman 2001; Semiglazov and Topuzov, 2009). In a recent handbook, the Halsted operation is defined as the "most typical and commonly used radical mastectomy" (Trufanov, 2018). In the oncology textbook, the Halsted procedure is defined as the "standard radical mastectomy" without further commentary (Davydov, 2020). Recent articles designated Halsted procedure as one of the main operations for BC. This method has been used and recommended also as a palliative procedure in disseminated BC (Ostapenko and Ostapenko, 2011; Portnoi, 2011; Portnoy and Srebny, 2014), which is hard to comprehend physiologically. The principle of informed consent was often disregarded. Patients with early cancers underwent mastectomies with resection of pectoral muscles. A surgery could be extended to a radical (Halsted) procedure if an intraoperative frozen section found an early (2 cm) BC (Demidov *et al*., 1990). The latter operation is known to be associated with complications. Old age was not regarded as contraindication to a radical surgery (Suspitsyn *et al.*, 1990).
In view of complications, some experts recommended the modified radical mastectomy of Patey with resection of only the smaller pectoral muscle for T1-2 laterally located BCs (Bazhenova *et al.,* 1987; Kuzin *et al.,* 1977, 1981). Others advocated the Halsted procedure (Datsenko and Abisheva, 1977). The Patey operation is also associated with adverse effects; nonetheless, it has been broadly used in the Russian Federation (RF) in last decades. During the author's practice (1995-1998) at the Ostroumov hospital in Moscow, incorporating the Centre for Senology (named Mammology in Russia), almost all mastectomy specimens independently of tumour size included the smaller pectoral muscle; but the Halsted procedure was applied as well. Tumor infiltration of the latter muscle has never been seen. The article by Khvastunov *et al. (*2007) discussed the "gradual abandonment of the Halsted operation". The study of neurologic symptoms after mastectomy in 247 women included 121 (48%) patients who underwent the operation of Patey and 73 (29%) that of Halsted (Shihkerimov *et al.,* 2008). In papers dated 2015-2022, the Patey operation was mentioned as a routine procedure (Bektursynov and Bayduvaliev, 2015; Bukkieva *et al.,* 2022; Yarema *et al.,* 2019); but the preservation of both pectoral muscles was finally becoming a standard. Today, the recommendations are adjusted to international patterns. Another extreme is observed: mastectomy without removal of pectoral muscles is called "mutilation" allegedly causing "severe moral injury", whereas "the reconstruction has become an integral part of the breast cancer management" (Khailenko *et al.,* 2023). Such statements are accompanied by images of women after reconstructive surgery, where breasts look (almost) as if not operated. Apparently, the motive is economic one as the costs of plastic surgery are borne by patients. Indications to different methods of breast cancer management are beyond the scope of this review. Obviously, aesthetic demands can be met in many cases by external prostheses.

### *DIABETES MELLITUS*

The surgical spleno-renal anastomosis with the shunting of pancreatic blood into the systemic circulation was introduced by Galperin *et al. (*1983, 1996a,b) and applied for the treatment of insulin-dependent diabetes mellitus. At the same time, Galperin (2017) wrote: "Diabetic patients generally tolerate surgery very poorly." The method was applied also in type 2 diabetes (Kirnus *et al.,* 1995; Putintsev *et al.,* 2010). The supposed mechanism was "creating a more optimal interaction of subcutaneously injected insulin and glucagon produced in pancreas" (Galperin *et al.,* 1996a). Of note, in patients with liver cirrhosis the surgical portocaval shunting resulted in deterioration of oral glucose tolerance (Pezzarossa *et al.,* 1986).

Diabetes mellitus was even regarded to be a contraindication for portocaval anastomosis operations (Dittrich, 1964).

In a series of 415 patients, early post-operative complications were observed in 28 patients including 2 cases of sepsis, 5 of pyelonephritis, 5 of pneumonia; 2 patients died in the first post-surgery week. Ketonuria was observed in 18 patients (Diuzheva, 1992), which agrees with the known fact that surgical stress may trigger ketosis in diabetics. Comparable percentages of complications were given in the article by Galperin *et al. (*1996a). The patients were subdivided into groups with a strong, moderate and absent effect (Galperin *et al.,* 1996b). There was no group with deterioration, so that the assessment was probably biased. According to another report, thrombosis of the shunt was found by angiography in 27% of the patients during eight months post-surgery (Nikonenko *et al.,* 1996). Severe acidosis was designated as a typical side effect (Nikonenko *et al.,* 1996; Torgunakov and Torgunakov 2010). The anti-diabetic efficiency of the shunting was moderate both in humans and in the experiment on dogs, whereas a majority of the animals did not survive the diabetes induction by streptozotocin or pancreatic resection with a subsequent shunting surgery (Galperin *et al.*, 1983). During one-year (1990) engagement in the United States, Galperin used his method on dogs and rats deploring that there was no opportunity to apply it in humans (Galperin, 2017).

By 2011, the surgical treatment of diabetes described above was still in use while a high risk of shunt thrombosis was pointed out (Torgunakov and Torgunakov, 2010). During the operations, biopsies from the pancreas (~0.5 cm) and kidneys were taken. Histological descriptions included glomerulitis with mesangium interposition, relocation of mesangial cells to the periphery of capillary loops and formation of double-contoured basement membranes, presented by the authors as features of diabetic glomerulosclerosis (Severgina *et al.*, 1994). In fact, these changes are typical for membranoproliferative glomerulonephritis. This condition, if found in a diabetic patient, is regarded as a superimposed disease potentially needing special therapy. Kidney biopsy is generally indicated for diabetics only if a renal condition other than diabetic nephropathy is suspected; details and references are in the book by Jargin (2024). The misrepresentation of histological features of glomerulonephritis as traits of diabetic nephropathy may lead to inadequate therapy. Renal and pancreatic biopsies are associated with risks. Invasive procedures applied within the framework of the surgical treatment of diabetes included also renal and splenic venography and celiac arteriography (Diuzheva, 1992; Galperin *et al.,* 1996a).

## *PEPTIC ULCERS*

The surgical treatment of gastro-duodenal ulcers in the former SU has been different from the international practice. Gastric resection (gastrectomy) became the predominant method of peptic ulcer management after the 24th All-Union Congress of Surgeons in 1938 (Balalykin, 2004; Brekhov *et al.,* 1983). According to the author's observations, resections were comparatively rarely performed abroad for peptic ulcers; their volume was smaller, often corresponding to antrectomy. For perforated ulcers, a local excision was usually performed, while a ring-shaped specimen of the ulcer was sent to the pathologist. Laparoscopic repair is used increasingly these days. In Russia, primary gastric resection (2/3-4/5 of the stomach), antrectomy with vagotomy, or a simple suture have been applied in perforated ulcers (Afendulov *et al.,* 2006; Chernousov *et al.,* 2016; Gostishchev *et al.,* 2009; Potashov *et al.,* 2005; Sazhin *et al.,* 2014; Vachev *et al.,* 2014). Relapsing ulcers after gastric resections or suturing of perforated ulcers were treated by resection or re-resection (Bachev, 1990). Adverse effects of resections were known (Balalykin, 2004; Pantsyrev *et al.,* 2008). The limited availability of modern medical therapy was designated as social indication for the stomach resection (Balalykin, 2004; Gostishchev *et al.*, 2009).

The hyper-radicalism in the gastric surgery originates from Sergei Iudin (the spelling is according to the PubMed; in earlier papers spelled Sergey Yudin), who was a "passionate supporter of gastric resections in ulcer perforations" (Alexi-Meskishvili and Konstantinov, 2006). According to his doctrine, the pylorus and lesser curvature must be resected at an ulcer surgery. Apparently, Iudin's reports on consequences of gastrectomy for ulcers were biased: ostensibly 92-94% complete cure, "transient and benign" post-surgery diarrhea in 5-8% of cases (Iudin, 2003). It is known that many patients after gastrectomy have significant symptoms including dumping syndrome often including diarrhea.

During the World War II, Iudin was a leading surgeon of the Soviet army. He was notorious for radical operations: "Total and wide resection of devitalized tissue… resection rather than drainage and removal of bone fragments in joint wounds (including knee and hip joints)" (Alexi-Meskishvili and Konstantinov, 2006); "Unhesitatingly excise muscular tissue to access fractured bone" (Iudin, 1943). Former health minister B.V. Petrovsky (1989, 1991) wrote that Iudin's radicalism in military surgery, followed by other surgeons, led to hemorrhages, extensive defects of osseous and soft tissues. Iudin's articles recommending stomach resection in ulcer patients were published later with approving editorial commentaries (Iudin 1991). References to Iudin continued until recently, mentioning the fact that he performed primary resections in 75% of cases of perforated gastroduodenal ulcers (Nishanov *et al*., 2011). Resection of the stomach in case of ulcer perforation has been advocated by many experts from the former SU (Babalich, 1999; Balalykin, 2004; Gostishchev *et al*., 2009; Komarov *et al.*, 2001; Kuzin and Chistova, 1995; Repin *et al*., 2011; Nishanov *et al.*, 2011; Vachev *et al.*, 2013). As mentioned above, the continuous adherence to this method was explained by the limited availability of modern drugs (Balalykin, 2004; Gostishchev *et al.,* 2009). In some articles recommending resections, it was stated that the drug therapy doesn't achieve a complete recovery, so that resection should be performed early to avoid complications (Babalich, 1999). The definition "complete recovery" seems to be hardly applicable to the condition after gastrectomy. Anyway, this strategy was in disagreement with that applied in other countries. Like in many topics discussed here, recommendations are currently adjusted to international patterns. Recent guidelines included laparascopic treatments and ulcer excision along with the suturing and resection among treatment options for perforated ulcers. A decrease in surgery rate in ulcer patients during last decades with almost complete disappearance of elective resections confirms an overuse in the recent past.

The attitude delineated above is reappearing, notably, in publications from military-medical institutions (Esipov *et al.,* 2024) as the army needs experienced surgeons. In recent publications, gastrectomy (resection) has been designated as the most frequent or single surgical treatment option of gastric ulcers (Krasilnikov, 2023; Chernousov *et al.,* 2016; Mikhin and Golub, 2014], designated as universal operation applicable for any ulcer location [Gladilina, 2014]. As before, appeals to "radicalism" in ulcer surgery can be heard. Gastric ulcers are listed in the first place among indications for gastrectomy, followed by duodenal ulcers with "humoral or mixed secretion type". Gastrectomy is generally recommended for gastric ulcers; as well as for peripyloric ones excerpt for small ulcers without humoral hyperacidity and motoric derangements, when selective proximal vagotomy can be considered. Antrectomy or gastrectomy is proposed as a choice also for duodenal ulcers. As in some papers cited above, advantages of early surgery for uncomplicated ulcers is emphasized (Esipov *et al.,* 2024) under the motto "surgery must come before complications" [Chernousov *et al.,* 2016]. For perforated gastric ulcers, 2/3 (or more) distal gastrectomy is advocated (Esipov *et al.,* 2024).

## *BRONCHIAL ASTHMA AND RESPIRATORY DESEASES*

Another method to be commented was the thoracic surgery with the denervation of lungs as a treatment of bronchial asthma (Babichev *et al.,* 1985; Gudovskii *et al.,* 2002; Meshalkin and Alperin, 1978) referred to as "the most accepted procedure" in the Guidelines by the Health Ministry (1988). Among others, the "skeletonization" of pulmonary roots with transection of nerves, auto-transplantation of lungs (complete removal with immediate re-implantation) (Meshalkin, 1968; Meshalkin and Alperin, 1978) or cross-section of trachea with subsequent suturing (Giller *et al.,* 1998) were applied. The theoretical ground was the assumption that denervation "precludes abnormal nervous impulsation" (Babichev et al., 1985). Such argumentation was usual at that time, when the so-called ideas of nervism, based on the concept of trophic function of the nervous system by Ivan Pavlov, were propagated. Exaggerated histological descriptions of "dystrophy" or degeneration in the autonomic nervous system, claimed to be irreversible, were presented as a theoretic basis of the denervation (Babichev *et al.,* 1983, 1985). Stepan Babichev, the main protagonist of the asthma surgery, was a military surgeon, later the chancellor of Moscow Medical Stomatological Institute (currently named University) and assistant of the Health Minister. The surgical treatment of asthma was recommended by the Health Ministry (1988) whereas thoracotomy with lung denervation was designated as “the most accepted surgical treatment.” The skeletonization was patented and advocated for steroid-dependent and infectious-allergic asthma varieties (Health Ministry, 1988; Smakov, 1999). Repeated bronchoscopies were applied post-surgery because of the bronchial drainage impairment (Meshalkin and Alperin, 1978). The pulmonary denervation and lung resections were recommended also for asthma cases when drug and inhalation therapy had been efficient. It was suggested that non-invasive treatment prior to the operation must be limited in time (Health Ministry, 1988). One research group found indications for surgery in 41.7% of 986 asthma patients; 457 operations were performed, whereas the following complications were recorded: in 27 patients - inflammation not otherwise specified; 12 - dysphagia, vocal fold palsy or Horner syndrome; 11 - pneumonia, empyema, pneumothorax, 2 cases of paraplegia and hemiparesis; 58 complications not otherwise specified; 6 patients died within a month after the surgery (Smakov, 1990). By 2002, the method was still in use (Gudovskii *et al*., 2002). Denervation was sometimes performed simultaneously with lung resection, lobectomy or bilobectomy (Babichev *et al*., 1972). In this connection, a quote from the recommendations of the Health Ministry (1988) deserves attention: “The widespread idea that indication for surgery in asthma is the ineffectiveness of conservative therapy is incorrect. The presence of foci of chronic inflammation in the lungs and bronchi, even with a good effect from conservative treatment, is an indication for surgery. Delaying the operation serves to involve other parts of the bronchial tree in the inflammatory process, enhances the degree of allergy, degenerative changes in the innervation apparatus and endocrine organs” (Health Ministry, 1988). Such instructions could lead to resection of largely preserved pulmonary tissues, which was noticed by pathologists.

The denervation surgery was sometimes combined with removal of pulmonary segments or lobes regarded to be pathologically altered (Health Ministry, 1988). Pulmonary resections in asthma were used also without denervation, even in the cases when inhalation or drug therapy was efficient. Sokolov et al. (1975) stated that ≤10% of their asthma patients underwent resections. The surgeries were performed also in patients with bilateral inflammatory or fibrotic lesions, both in exacerbations and in remissions, supposed to be indicated for a radical treatment of asthma. This concept was advocated by Uglov (1976, 1984), who claimed a “resection of infected foci” to be the aim of asthma management. The therapy was based on the belief that “in 98% of cases, the cause of asthma is focal chronic pneumonia”. The purpose of the operation was the “removal of focal infection.” Localized chronic pneumonia with bronchial lesions was by itself regarded to be indication for lung resection. Asthma patients were transferred from internistic departments for the surgical and bronchoscopic treatment. “After a course of therapeutic bronchoscopies”, Uglov and his followers performed resections of the parts of lungs regarded by them to be pathologically changed.

Resections were applied to children with recurrent bronchitis and/or pneumonia; while particular efficiency of pneumonectomy was stressed, also in case of bilateral involvement (Glkova and Volkova, 1968). The recommendation for progressive chronic pneumonia was “lobectomy for segmentary lesions and pneumonectomy in all other patients” (Shulutko *et al.,* 1972). Reportedly, “dysontogenetic” lung diseases in children were a more frequent indication for radical surgery than acquired conditions; whereas lobe- and pneumonectomies were predominantly applied (Zolotarev, 1976). Esipova et al. (1990) found malformations in 66% and “bronchial diverticulosis” in 64% of resected specimens from children operated for relapsing pneumonia or “bronchitis deformans”. The same authors reported that, contrary to preceding publications, the changes in their material were not diffuse but local, thus justifying resections. Contemporary international literature was referenced scarcely in suchlike papers. Prof. Esipova (et al., 1990, 1996), a well-known expert often cited in Russia, claimed that misdiagnosis of malformations as chronic bronchitis led to undue postponements of surgery. In accordance with this concept, pathologists described in surgical specimens' inflammatory infiltration, fibrosis, dystrophy and malformations without specifying their extent and severity.

Some proposed criteria of malformations were formulated and illustrated unconvincingly: large bronchi with uneven, serrated (jagged) contours, bushy aggregations of small bronchi and bronchioles, variously differentiated mesenchyma with lymphoid infiltration, rhythmic muscular fascicles, local agenesis of alveoli represented by connective tissue, etc. (Esipova and Vladimirtseva, 1996); the histological images are in the book by Jargin (2024). Reading descriptions by Esipova et al. (1990), it seems to an ex-Soviet pathologist that some resected lobes were not significantly abnormal: macroscopically whitish foci and coal pigment, singular cysts 2-3 mm; microscopically atypical bronchial branching, hypoplasia of bronchial walls, abnormal epithelial cilia etc. Descriptions of this kind were often used for largely normal specimens; clinical significance of the findings being unclear. However, such reports from pathology departments were suitable to justify resections. Undoubtedly, in some cases the surgery was indicated; but there has been an overtreatment tendency. It was rightly noted that many authors made no distinction between congenital malformations and developmental variants (Perelman and Platov, 1976). In a more recent publication, an opinion was expressed that some histological phenomena described as malformations are common in postnatal lungs normally or after resolved pneumonia (Putov and Varlamov, 1999). It was also noticed that diagnostics of lung malformations is difficult; the percentage of wrong diagnoses amounting to 65-75%. The patients were operated nonetheless based on the assumption that inflammatory complications are inevitable (Lovacheva, 1984).

Concluding their articles, some pathologists generalized that the "disease that affects children in the first year of life, against the background of morpho-functional immaturity of the lungs, intense metabolic processes and imperfection of local nonspecific and immunological defense, is accompanied by a breakdown of typical protective reactions, impaired regeneration and postnatal development of the lungs, excessive expression and rapid depletion of compensatory and adaptive processes. The latter underlies the alterative-exudative changes, the impossibility to delimit inflammation, determines the progressive course of bronchiectasis and *requires surgical treatment at the age of 2-6 years*" (Bubnova, 1991). An overuse of surgery in tuberculosis is discussed in the book by Jargin (2024).

## DISCUSSION AND CONCLUSION

It is known that invasive procedures can exert a placebo effect, which might have contributed to reported efficiency of some methods discussed here. However, by definition, placebo must be free of risks and adverse effects. Factors contributing to the persistence of suboptimal practices include a partial isolation from the international scientific community, shortages of medical education, unavailability of many internationally used handbooks (Jargin, 2024; Senokosova, 2019). Admittedly, foreign literature is available via the Internet today, many guidelines being adjusted to international standards. It is taken for granted and nobody gives thanks. We can hardly imagine what immense work and immaculate integrity stands behind reliable medical research. On the contrary, some writers analyze complications of therapy in foreign countries without mentioning professional misconduct in Russia (Vovk *et al.*, 2007).

Certain published instructions have remained without due commentaries, so that a comeback of suboptimal practices is not excluded. Suboptimal practices have been used as per instructions by healthcare authorities and leading experts' publications. The lacking professional autonomy has contributed to the persistence of outdated methods in the healthcare (Danishevski *et al.,* 2009). Some colleagues encountered impediments to their careers when they did not collaborate in dubious research and practice. Manipulation of statistics has been not unusual (Jargin, 2020). In conditions of paternalism, misinformation of patients, persuasion and compulsory treatments are regarded to be permissible (Mikirtichan *et al.,* 2022).

As far as we know, the Soviet and present rulers, the party and military nomenklatura, did not allow the use of invasive procedures without indications on themselves and their relatives. Functionaries' sons did not treat gonorrhoea by tamponade and bougienage of the urethra; alcoholics from their milieu have not been compulsorily treated by drip infusions days on end being infected with viral hepatitis, neither they drink technical ethanol sold in vodka bottles through legally operating shops. As for the medical personnel, it is unlikely that they applied dry cutting and poor-quality fillings to discoloured pits and fissures in their children, cauterized cervical ectopies, or performed Halsted mastectomy on their family members; details and references are in the book by Jargin (2024). This implies that there has been extensive deliberate infliction of bodily harm.

Military functionaries and their relatives will become more dominant thanks to the armed conflict. Those participating in it, factually or on paper, are obtaining the veteran status and hence privileges over fellow-citizens. Some of them will occupy leading positions in universities without adequate preparation and selection. War veterans enjoy advantages in the healthcare and everyday life; there are, however, misgivings that the status has been awarded gratuitously to some individuals from the privileged milieu. At the same time, relatives of superior officers evaded conscription under various pretexts. In particular, many institutions of higher education grant exemption from military service. Being not accustomed to hard and meticulous work, some of the functionaries' protégés have been involved in professional misconduct of different kind (Jargin, 2020).

Some invasive methods with questionable indications were introduced or advocated by first generation military surgeons. The Soviet period brought about an expansion of admission numbers to universities and medical educational institutions, sometimes with little regard for the quality of the academic preparation of students. One of the motives to overuse invasive procedures was personnel training, among others, with the objective of readiness for war. Note that military and medical ethics are not the same. The comparatively short life expectancy in Russia is a strategic advantage as it necessitates less healthcare investments and pensions. Malignancies are diagnosed in Russia relatively late. Ethical and legal basis of medical practice and research has not been sufficiently known and observed in Russia. The term "deontology" is often used for medical ethics in this country. Textbooks and monographs on deontology explained the matter somewhat vaguely, with truisms and generalities but not much practical guidance. Today, the growing economy enables acquisition of modern equipment; and medical research is on the increase. Under these circumstances, the purpose of this review was to remind that, performing surgical or other invasive procedures, the risk-to-benefit ratio must be kept as low as possible. Insufficient coordination of medical studies and partial isolation from the international community can result in parallelism in research, unnecessary experimentation, and application of invasive procedures without sufficient indications. Considering shortcomings of medical practice, research and education, governmental directives and increase in funding are unlikely to be a solution. Measures for improvement of the healthcare in Russia must include participation of authorised foreign advisors.

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