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Alcohol-related deaths – a retrospective study from the region of northern Slovakia

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SUMMARY

The study of cases with post mortem blood ethanol concentration of 2.00 g/kg and higher was performed at the Institute of Forensic Medicine in Martin, covering the region of North Slovakia. The aim of the study was to quantify the fatal consequences of acute ethanol administration reflecting in the annual mortality range, establish the causes of death, age and gender distribution of the deceased population, place and time parameters of deaths. The analyzed period was throughout the years 1993-2012.

Keywords: alcohol – acute intoxication – cause of death – statistical analysis of deaths

Úmrtia v súvislosti s alkoholom – retrospektívna analýza z regiónu severného Slovenska

SOUHRN

Súdne lekárstvo je neustále konfrontované s početnými úmrtiami v dôsledku intoxikácie alkoholom či chorobných komplikácii chronického alkoholizmu. Lekári Ústavu súdneho lekárstva a medicínskych expertíz v Martine vykonali retrospektívnu štúdiu týchto prípadov úmrtí v regióne severného Slovenska. Cieľom výskumu bolo kvantifikovať fatálne dôsledky nadmernej akútnej administrácie alkoholu stanovením jej štatistického podielu na úmrtnosti populácie v spádovom regióne; poskytnúť prehľad o príčinách smrti; stanoviť spoločné charakteristiky populácie zomrelých a okolnosti úmrtí v zmysle miestnych a časových parametrov. Predmetom skúmania boli úmrtia, pri ktorých bola po nariadenej pitve metódou plynovej chromatografie stanovená koncentrácia alkoholu v krvi 2,00 g/kg a viac. Analyzované obdobie tvoril 20-ročný časový diapazón rokov 1993 až 2012. Výsledky výskumu potvrdili dominanciu mužského pohlavia v 88 % prípadov. Každá 5. osoba zomrela na akútnu otravu alkoholom, ktorá bola najčastejšou príčinou smrti. Úrazy chodcov pri smrteľných dopravných nehodách tvorili druhú najpočetnejšiu skupinu úmrtí. Závery štúdie dokladujú aj schopnosť etanolu navodiť deliberáciu (auto)agresívnych tendencií jedinca, odrážajúc sa v samovražednom a homicidálnom konaní. Predložené výsledky nadobúdajú nielen súdnolekársky význam ale aj verejno-zdravotnícky význam pri smerovaní trendov preventívnej osvety.

Kľúčové slová: alkohol – akútna intoxikácia – príčina smrti – štatistická analýza úmrtí

Soud Lek 2016; 61(3): 30–34

Alcohol-related deaths represent more than 10 % of all European Union mortality and confirm the importance of national prevention strategies for problems related to excessive alcohol administration (1). Worldwide statistics of World Health Organization (WHO) say that alcohol consumption is responsible for more deaths than HIV or violent criminal acts, as around 25 000 people die annually due to acute alcohol consumption and more than 100 000 due to consequences of chronic alcoholism (2,3). Literature mentions that 6.2 % of deaths in males and 1.1 % of female deaths happen in relation with hard drinking, but amount of male deaths has decreased since 2010 (4,5). In the U.S. more people die due to fatal traffic accidents with heavily drunk drivers involved than die due to the shot wounds (6).

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MATERIALS AND METHODS

The author made the intended research by evaluating available data about the deceased and death circumstances obtained from the death certificates, autopsy protocols and police investigation files in cases of deaths with *post mortem* blood alcohol concentration (BAC) of 2.00 g/kg or higher. All fatalities took place in the North Slovakia region. Continuous 20 years period of 1993-2012 was analyzed. BAC was estimated using gas chromatography - Head Space methodology.

RESULTS AND DISCUSSION

A) Mortality rate of the analyzed subjects (Chart No. 1)

2317 forensic expertizes were done in the cases of death due to consequences related to previous "binge" drinking episode. The mortality rate doesn´t show any specific trend throughout the 20 years of the analyzed period. Decrease of the mortality during the last 7 years can be explained by the decreased amount of ordered autopsies.

B) Cause of death (Chart No. 2)

Acute ethanol poisoning included the biggest amount of deaths accounting for 22.74 % of all cases. Every fifth person died after an excessive episode of hard drinking (3.7 % of all

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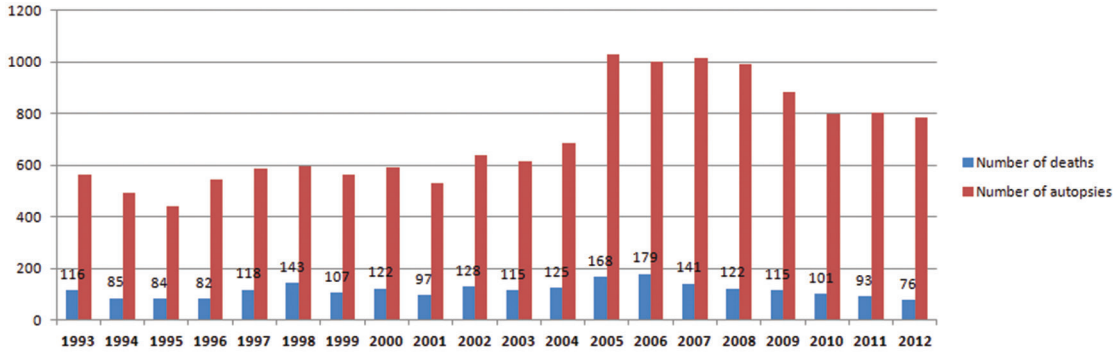
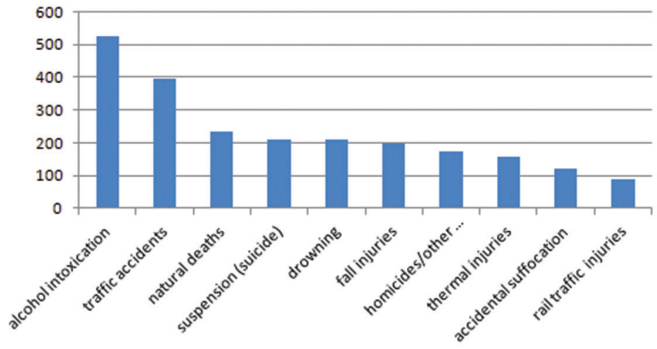
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Sum
Number of deaths	116	85	84	82	118	143	107	122	97	128	115	125	168	179	141	122	115	101	93	76	2317
Number of autopsies	564	494	440	544	585	594	564	593	532	640	614	686	1031	1003	1015	991	884	801	803	783	14161



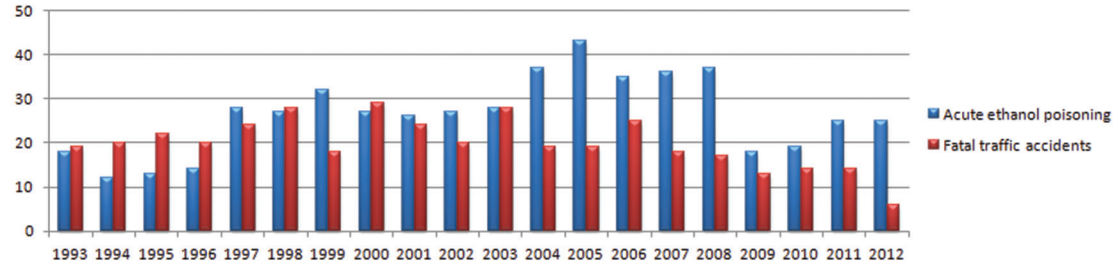
Graph 1

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Sum
alcohol intoxication	18	12	13	14	28	27	32	27	26	27	28	37	43	35	36	37	18	19	25	25	527
traffic accidents	19	20	22	20	24	28	18	29	24	20	28	19	19	25	18	17	13	14	14	6	397
natural deaths	17	8	10	8	9	18	8	10	7	14	13	14	22	15	12	11	13	11	8	7	235
suspension (suicide)	10	6	8	11	6	13	10	8	9	10	11	5	21	11	5	16	14	19	8	10	211
drowning	7	8	5	7	7	14	9	9	6	14	4	16	17	23	18	9	14	10	8	3	208
fall injuries	12	9	6	4	7	10	7	8	8	11	10	9	16	20	18	15	10	5	8	5	198
homicides/other suicides	13	8	6	3	18	12	10	14	6	9	12	7	6	10	7	4	7	4	11	5	172
thermal injuries	8	3	2	6	11	6	3	7	4	13	5	7	8	22	12	4	19	6	3	9	158
accidental suffocation	10	7	3	5	4	8	8	5	4	3	3	5	10	12	11	5	3	9	4	3	122
rail traffic injuries	2	4	9	4	4	7	2	5	3	7	1	6	6	6	4	4	4	4	4	3	89
Sum	116	81	75	78	114	136	105	117	94	121	114	119	162	179	141	122	115	101	93	76	2317



Graph 2

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Acute ethanol poisoning	18	12	13	14	28	27	32	27	26	27	28	37	43	35	36	37	18	19	25	25
Fatal traffic accidents	19	20	22	20	24	28	18	29	24	20	28	19	19	25	18	17	13	14	14	6



Graph 3

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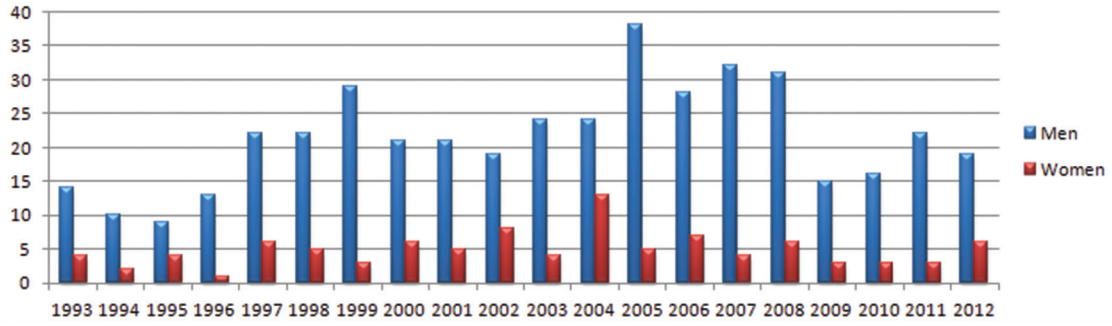
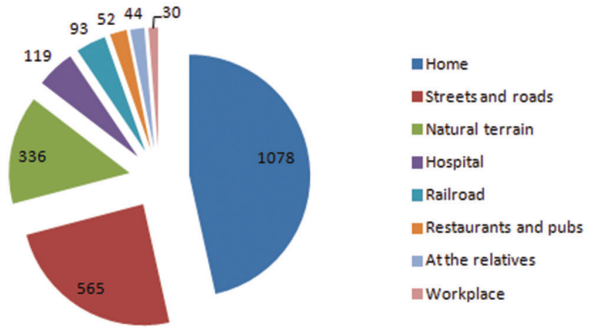
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Sum
Men	14	10	9	13	22	22	29	21	21	19	24	24	38	28	32	31	15	16	22	19	429
Women	4	2	4	1	6	5	3	6	5	8	4	13	5	7	4	6	3	3	3	6	98
Sum	18	12	13	14	28	27	32	27	26	27	28	37	43	35	36	37	18	19	25	25	527

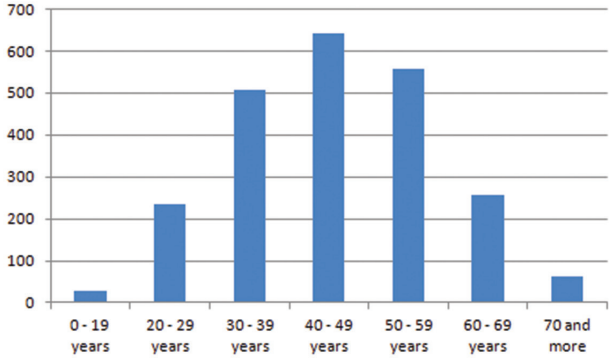


Graph 4

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Sum
Home	57	29	28	31	54	65	51	58	48	65	58	59	93	71	64	66	60	41	38	42	1078
Streets and roads	28	20	26	22	35	33	27	32	23	25	36	28	32	54	32	25	24	28	21	14	565
Natural terrain	14	15	9	12	15	21	14	15	12	17	5	25	23	26	23	21	23	19	19	8	336
Hospital	10	9	6	5	5	5	6	3	4	6	4	3	9	17	10	4	3	1	5	4	119
Railroad	2	4	8	4	3	7	3	5	3	8	1	6	6	5	6	5	4	6	4	3	93
Restaurants and pubs	2	5	2	1	5	4	2	4	2	2	5	2	3	2	3	0	1	2	2	3	52
At the relatives	2	3	4	2	1	3	1	2	2	4	3	1	1	4	3	1	0	3	4	0	44
Workplace	1	0	1	5	0	5	3	3	3	1	3	1	1	0	0	0	0	1	0	2	30
Sum	116	85	84	82	118	143	107	122	97	128	115	125	168	179	141	122	115	101	93	76	2317



Graph 5



Graph 6

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Sum
0 - 19 years	0	0	1	4	3	3	0	2	1	4	2	3	0	1	0	4	0	0	1	0	29
20 - 29 years	13	7	13	9	13	15	11	14	8	17	9	10	12	25	9	9	10	14	12	4	234
30 - 39 years	29	25	26	18	25	30	23	39	38	52	24	27	33	22	13	16	15	18	18	15	506
40 - 49 years	41	24	21	21	28	52	40	25	22	40	39	32	57	51	38	32	23	19	20	18	643
50 - 59 years	22	15	9	15	28	24	22	24	20	12	32	34	54	49	52	34	29	32	24	25	556
60 - 69 years	5	10	10	11	18	15	9	16	7	3	8	16	10	23	22	15	17	17	15	10	257
70 and more	2	4	4	4	3	4	2	2	1	0	1	3	2	8	7	1	7	1	2	4	62
Sum	112	85	84	82	118	143	107	122	97	128	115	125	168	179	141	111	101	101	92	76	2287

performed autopsies), what makes acute alcoholism still more alarming social problem (7,8).

The most of the 397 deceased involved in the traffic accidents were pedestrians. Comparing previous two groups shows a "positive" mortality trend reflecting in continuous decrease in both the traffic fatalities and acute ethanol poisoning related deaths, even though, at the beginning, traffic accidents accounted for more fatalities than alcohol intoxication itself. Noticed continuous prevalence of the fatal alcohol intoxications over traffic fatalities at the end of the analyzed period is especially important for the police organs which have been trying to accept repressive safety measures, so as to lower their annual amounts – see Table No. 1. Consumption of alcoholic beverages before driving is considered to be the most risk factor in road traffic accidents in North Slovakia region (7). Published experiences obtained by the international research indicate that the role of alcohol in fatal accidents tends to be understated in public media reports. This evidence suggests that public support for alcohol harm reduction policies could be increased if public awareness about the lethal potential of alcohol was more presented through the media (10).

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Tabl. 1: Annual evaluation of the fatal traffic accidents rate in the Slovak Republic – up to the Ministry of Internal affairs of SR

Year	Number of traffic accidents	Deceased	Positive ethanol	Pedestrians	Cyclists
2004	61 233	603	2851	196	66
2005	59 991	560	2632	157	46
2006	62 040	579	2887	194	45
2007	61 071	627	3110	208	53
2008	59 008	558	3122	184	40
2009	25 989	347	2524	104	14
2010	21 611	345	2126	113	21
2011	15 001	324	1903	75	18
2012	13 936	296	1726	66	25

Natural deaths accounted for 10.1% of the 20-years´ mortality rate with absolute dominance of cardiovascular chronic diseases including alcoholic dilated cardiomyopathy, followed by pathological entities involving the gastrointestinal tract - death due to rupture of the oesophageal varices and alcoholic liver disease.

Attenuating the self-preservation instincts by alcohol reflected in high amount of committed suicides (11), where hanging was the most common manner of performing the suicidal act. Excess mortality due to affective psychiatric diseases is established for various causes of death, but the results of many studies highlight the major role of alcohol in depression mortality (12). Very risky group of alcohol influenced persons, who are more threatened by death of hypothermia, drowning due to fall to the water environment, or accidental head injury is defined among those returning home from pubs (13). Finally, excessive alcohol consumption may potentially lead even to involuntary manslaughter - without the intent to harm or cause death. Janík et al. reported amateur – "iatrogenically" induced unusual fatal injury of the back, initially suggestive of homicidal origin, where the victim and his two acquaintances were under heavy alcohol influence during performing "the surgical act" (14).

C) Sex of the deceased in the analysed group (Chart No. 4)

Predictably, up to the expectations based on the historical social conventions, the analysis confirmed predominance of male acute alcoholism. Male to female ratio in the number of deaths reached 7,5 : 1. Previously mentioned certifies that women tend to drink "more carefully" and seem to handle "binge" drinking with higher control. Even though male population seems to be more risky for alcohol-related deaths, female deaths are more often related to chronic alcoholism than to the acute ethanol administration and still tend to exceed.

Up to the information coming from our "neighbour" countries, alcohol-related deaths were particularly high in men in the Eastern Europe, where the rates for women were also higher in comparison with other European countries (15).

D) Place of death (Chart No. 5)

The most common cause of death at people´s homes, where the most of deaths took place, was acute alcohol poisoning. Phenomenon of "home drinking" is more common in the female part of population as women are aware of the critical public view on female alcoholism even by the recent modern society. Many of the deceased died during their way home from the pubs in the city environment including mainly streets and roads due to variable multiple injuries inflicted in road traffic accidents, especially in pedestrians but even in car drivers, solitary cranial trauma following the fall directly at the site of the inflicted injury or due to complications leading to cardio-respiratory failure during the short-time surviving period.

E) Time factors analysis

The biggest amount of deaths happened in October and the lowest in August. Tendencies to consume alcoholic beverages are most intense during the weekends with the Friday at the 1st place and Saturday at the 2nd. The 3rd place in number of deaths goes to Mondays, what can be explained by the rest of alcohol from the previous night binge drinking episode.

F) Age structure of the deceased (Chart No. 6)

The youngest deceased was 16-years old boy who died due to severe multiple injuries in the road traffic accident with 2.26 pro mille of alcohol in blood. Alarming finding is that 4 teenagers died due to acute alcohol poisoning without any coincidental trauma or acute illness. On the other hand, population of elderly adults experience a "disadvantage" caused by the age-related physiological changes that lead to the increased sensitivity and decreased tolerance to alcohol. Therefore it is not surprising that there is a number of age-related harms such as falls, social isolation and abuse, which are compounded by alcohol misuse (16). Most recently, the net burden caused by alcohol consumption in the European Union among the population aged 15-84 years was estimated to be one of 7 deaths in males and one of 14 deaths in women (17).

CONCLUSION

As consumption of alcoholic beverages became a part of everyday social life among the male as well as female population from the earliest "teen-aged" to the elderly ones, uncovering the causes of deaths related to acute ethanol administration or chronic ethanol abuse complications is still an important part of forensic practise. We are headed with a number of cases where alcohol played a crucial role in the deaths due to acute intoxication, which still is more common in men, as well as in cases where it accompanies death – suicides, accidental injuries, hypothermia, submersion etc. Up to the results of the presented research we can notice also some positives – decreasing trends in fatal road traffic accidents under alcohol influence. However, up to the reports from the "surrounding" countries, as well as from the Western part of the European Union we are still heading the problem of adolescent alcohol abuse and alcohol-related comorbidity in the higher age groups. Although public

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health policies include the information sharing about ethanol's lethal potential, it seems not to be enough. In the field of drug and alcohol addictions, forensic medicine cannot be excluded from the attitude building process as it is the examination of the circumstances of death and body itself what brings us the major part of knowledge what ethanol is capable to cause.

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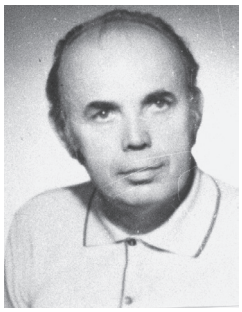
OSOBNÍ SDĚLENÍ

Prof. MUDr. Josef Korbička, CSc. – smutná zpráva



Nepíše se dobře informace pro kolegy, že odešel jeden z nás, i když v obdivuhodném věku 89 let. Narodil se 24. 2. 1927 do chudé, neúplné rodiny v obci Rodkov na Vysočině. Již v základní škole byl pro velmi dobrý prospěch doporučen v r. 1939 svým učitelem k dalšímu studiu ze státní podpory. Reálné státní gymnázium v Tišnově dokončil v r. 1947 úspěšnou maturitou a tentýž rok nastoupil na Lékařskou fakultu Masarykovy univerzity v Brně, kde promoval v r. 1952. Jeho životním snem byla práce praktického lékaře na rodné Vysočině, ale osud chtěl jinak a 3 týdny před promocí, kdy měl dokonce již umístěnku na přidělený obor interního lékařství v tehdejším kraji Gottwaldov, byl kádrovým oddělením LF víceméně proti své vůli vybrán, i když nestraník, jako člověk proletářského původu, aby se stal odborným asistentem na anatomii u dodnes uznávaného, a nejen studenty obávaného prof. Žlábka, kde byl tehdy kritický nedostatek pedagogických sil. I když o tento teoretický směr neměl nikdy zájem, místo, především na přání své budoucí ženy, přijal. Po 6 letech tvrdé práce, kdy se mu dostalo i prvního uznání od prof. Žlábka, se politická situace ve 2. polovině 50. let přiostřovala a v důsledku nové vlny prověřování a upevňování kádrů k posílení KSČ byl jako stále nestraník přeřazen ze škatulky dělnického původu do škatulky intelektuál. V září 1958 mu bylo kádrovým oddělením děkanátu oznámeno, že svými postoji nedává záruky správné socialistické výchovy budoucí lékařské generace a hrozilo rozvázání pracovního poměru s fakultou. Rychle si proto sehnal místo sekundáře na chirurgii v nemocnici Boskovice. Začal s přípravami na přestěhování, ale dle doporučení a na přímou přímluvu prof. Žlábka nakonec přestoupil na právě uvolněné místo asistenta na I. patologicko anatomickém ústavu FN u sv. Anny v Brně, kde pracoval od r. 1958 do r. 1972. Tehdy jsem jej poprvé potkal i já, tenkrát na tomto ústavu jako pomocný demonstrátor, a to shodou okolností na jeho „farewell-party". Dva roky po přechodu na soudní lékařství habilitoval. Jistou dobu zastával funkci školského zástupce přednosty, posléze se sám v r. 1991 stal přednostou, od r. 1992 jako profesor. Po odchodu do důchodu v r. 1994 ještě pracovně navštěvoval svůj ústav, a to až do r. 2000.

Je až pozoruhodné, jak byl prof. Korbička na svou dobu odborně zcestovalý. Desetiměsíční pobyt v r. 1965 v Patologickém a neuropatologickém ústavu Univerzity v Zagrebu. V r. 1966 dva měsíce v Ústavu patologie v Rijece. Studijní pobyt v Ústavu soudní medicíny v Debrecénu a v r. 1983 procestoval Ústavy soudního lékařství v Düsseldorfu, Basileji a Vídni.

Do posledních chvil svého života byl plně orientován, projevoval intenzivní zájem o dění v medicíně i celkově ve společnosti. Byl to člověk silně věřící, což mu dle jeho slov, dávalo sílu si uchovat svoji osobnost a názory a nepodlehnout tlakům okolí, i když by mu to jistě život v mnohém usnadnilo, ovšem zcela určitě nenaplnilo. Zemřel po půlročním pobytu ve Fakultní nemocnici Brno na bronchopneumonii dne 3. 4. 2016 v ranních hodinách.

Čest jeho památce.
Miroslav Hirt